SOCIALIST FACADES PARAMETRIZED

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Abstract

In my explorative diploma thesis “Socialist Facades Parametrized” I study and try to understand the facades of buildings from 27 countries of the Eastern Bloc built between the years 1954 and 1991.Through analyzing, understanding and parameterizing these facades my aim is to present a logical continuation of the development of architectural language which ceased to exist by the start of the 1990s. This thesis is not meant to propagate any kind of post-communist nostalgia or support any political movement, its goal is to recognize interesting approaches to façade ornamentality and possible uses in the contemporary context. The thesis consists of two equally important parts: the analytical part and the creative part.

The first, analytical part of the thesis is based on the collection, selection, and further sorting of those facades into categories based on geometric similarity. This geometric similarity is then used for exploring parametric possibilities of such facades. The first goal of this thesis is to both learn more about Eastern Bloc’s so-called Socialist Modernism facades (1954-1991) and to change the perception of socialist architecture as just a group of grey boxes by presenting interesting examples. Also, there is my wish to learn more about the visual and general identity and cultural space of the Eastern Bloc.

The second, creative part of the thesis is about the exploration of parametric modeling to create facades inspired by Socialist Modernism facades using parametric tools and their flexibility. An important task in this part is to learn and understand parametric modeling tools and the creation of a parametric generator of facades inspired by Socialist Modernism. Another goal is to explore facade generator in the everyday practice of building design to experiment quicker. This step goes together with a general understanding of this emerging phenomenon and its use in architecture.

In addition to enriching and developing my current architectural language with historical elements, I hope that my diploma thesis will be source of inspiration to colleagues too.

Foreword

The process of choosing the diploma thesis theme was not easy. Over the few years in which I have been active in architecture, the themes of Monumentality, Socialist Modernism, and Brutalism kept returning to my thoughts. Moreover, I wanted to reflect on the seven years of studies and internships, and how my architectural thinking has developed during those years.

My interest in socialist architecture has two main roots: my personal background and my professional experience during the Erasmus exchange.

I grew up in the Czech Republic, where I was born in 1994, five years after the Velvet revolution in 1989 and the year after the split of Czechoslovakia in 1993. I am part of the first generation born into a free country after the long totalitarian rule of the communist party. My childhood was normal from my point of view, but I think everybody considers their childhood normal.

Growing up in a post socialist republic probably affected me probably more than I would expect. The regime and its ideology were embedded in the landscape, buildings and for sure in the mentality of people. Even though I grew up out of this context, I still feel affected by it because all people older than my parents spent more than half of their lives in that reality.

Now, after several years spent abroad from my home country, I'm starting to understand how much life behind the iron curtain was different from the one which people led in the west.

I decided to work on this thesis partially because the longer time I am spending abroad more I am trying to understand my own identity. Part of this identity has its origin in environments I have encountered during my lifetime and where I have lived. And I believe that my identity is codependent on the people which have been surrounding me. I suppose this can be said for any place, that the lives of people are affected by the environment which is a result of a long list of historical and political processes.

In 2015 when I was on the Erasmus exchange in Bulgaria, I was strongly interested in socialist monuments. I started a survey to create a small map of monuments in Bulgaria and the surrounding countries in order to visit them with my friends. I was and still am fascinated by their appearance and by their surroundings. I have very ambivalent feelings about these monuments. In my eyes, they are a perfect example of how totalitarian and oppressive regimes work with monumentality and historical reminders. Those monuments are often celebrating some events from history, usually not connected with the regime, but they are used as a tool of ideological propaganda. Most of those monuments are huge concrete structures sitting on the top of the hill, in the middle of nowhere or above the city. The scale of the monuments is completely out of this world, it is suprising and to a certain degree scary, because as I understand it, the scale of objects should symbolize how much power the regime has over the individual.

But on the other hand, it is fair to say that most of those monuments have high visual qualities. They are extraordinary works on the border between architecture, sculpture, and art. In many cases, authors of these buildings have been between the best in their fields. The fact that some object has been done under a problematic regime does not mean that it is low quality, or we should overlook its significance.

Besides this specific kind of architecture, I am continually fascinated by science and technology. I deeply appreciate scientists, researchers, and in general everybody who strives to push us as humankind further with their efforts. This passion is reflected by my interest in technological advancements and software which can be used in developing the architectural and building industry. I am continually trying to include digital design tools for my work. Because I believe there is a great number of lengthy processes that can be simplified or replaced by the use of digital tools to be able to focus more on the design itself. Although I must admit there are dangers in implementing those tools uncritically because, in my opinion, the use of tools should not be more important than design thinking itself. These tools must be used cautiously with well-managed reasons and goals.

This thesis is based on an effort to combine both of these interests: technology and socialist architecture

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Introduction

This diploma thesis Socialist Facades Parametrized aims to explore facades with ornamental qualities of buildings from 27 countries of the former Eastern Bloc built between the years 1954 and 1991. Architecture in the socialist countries of East and Central Europe and the Soviet Union from 1955, just after the death of Soviet leader Joseph Stalin until 1991, when the socialist period ended, is called “Socialist Modernism” (Asociatia Birou Pentru Arta si Cercetare Urbana, 2017,).

The Constructivist era (1920’s-1930’s) and Stalinist architecture also called Soviet Classicism (1930’s- 1950’s) predated the Sosialist Modernism (1955-1991). Under Nikita Khrushchev’s regime Socialistic Modernism was introduced where the additional ornaments were not appreciated. This development simplified the appearance of the buildings and their production significantly. Sosialist Modernism ended with the dissolution of the Soviet Union and socialism in its satellite states between the years 1989 and 1991.(Belogolovsky, n.d.)

This thesis aims to bring up the common misconception that buildings in the Eastern Bloc were just grey boxes by showing also good examples and working with them further to demonstrate that Socialist Modernism architecture has still things to offer. In my opinion we should utilize the building style of the given era. I am willing to share my own inspiration concerning Socialist Modernism with colleagues and present one of the possible approaches to utilize it. My thesis consists of two parts, analytical and creative one.

The task in the first analytical part of my diploma thesis is to study by analysing and categorising the facades and recognize their features. This survey will have several consecutive steps which will result in the family tree of facades which provides a framework to understand the geometric base of selected façade elements.

The creation of such a framework requires a systematic approach and planning to create a functional system. This process consists of searching for examples and choosing those examples to be studied further. After analyzing facades’ geometrical base I divided them into families based on their shared properties. Finally, I analyzed the defining parameters of each family to recognize and present the shared geometrical roots of the given group. In order to be able to parametrize, the learning process of how to use parametric tools preceded the final phase.

The first, analytical part creates a base of understanding from which I will draw inspiration to the second, creative part of the thesis.

In the second part, I use the acquired knowledge of the geometry of Socialist Modernism facades together with the defining parameters as inspiration to create a Socialist Facade Generator - a parametric tool with which one may create basic façade sketches inspired by the geometric qualities of original Socialist Modernism facades.

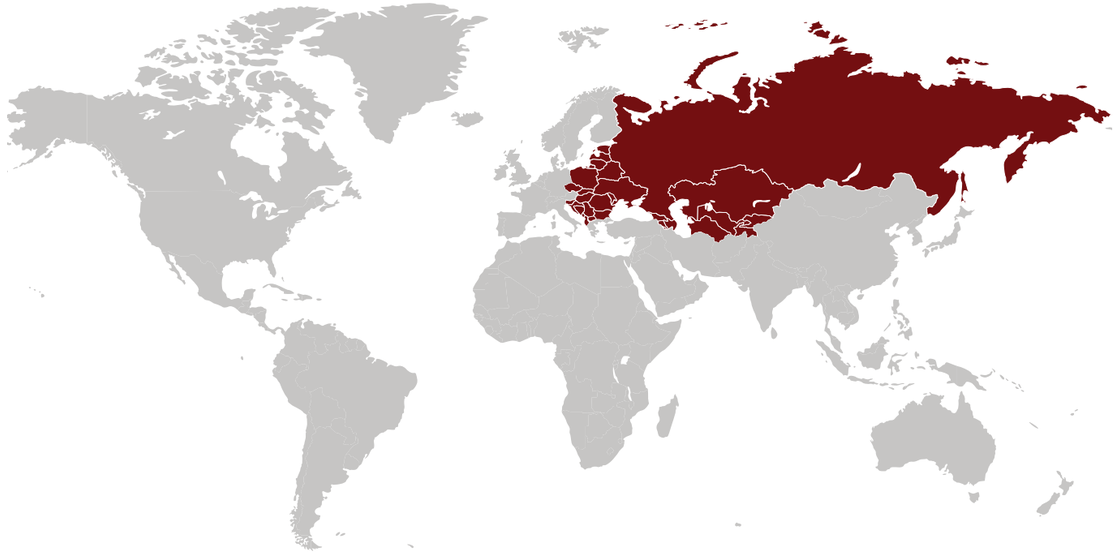
My goal is to improve my ability to use this technology since the promises and possibilities of it are large. I designed my thesis processes to use sets of relatively basic tools and operations to obtain a better overview of what parametric tools are capable of

and to set my knowledge base for exploring these possibilities further in the future. This process of using algorithmic tools together with inspiration from the past as a logical continuation of the development of architectural language which ceased to exist by the start of the 1990's.

In my diploma thesis I am working with the idea that most things have already been invented, but what we call novelty may be achieved by using already known ideas or shapes in new contexts. In the following pages, I provide wider context and definitions which may help understand the thesis as well bring up some themes which I have encountered during work on my thesis.

Geographical frame

The geographic definition of the area of interest is 27 countries which resulted from the breakdown of the Soviet Union and its satellite states visualized on the map on the next page. This area includes Central and Eastern Europe, Balkan, Caucasian republics, Central Asian republics, Baltic countries, and of course the whole Russia itself. The 27 countries are listed under the map. I am using the country codes in the captions to identify where each building is located.



Countries of former Eastern bloc:

Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, East Germany, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

Facade

The dictionary definition of façade, *the principal front of a building, that faces on to a street or open space* (Oxford University Press. 2020), is too broad for the needs of my thesis. In my diploma thesis, I consider the building massing to be able to function without a specific facade element or if the façade elements were different shape or form, still the function of the building would not change drastically. In addition, I find it important to differentiate between the plasticity of the façade and the shape or massing of the building itself. However, with some of the facades this was hard to define, I tried to be as consistent as possible. Later in my process, while sorting into geometric families, I created specific families for facades which are both ornamentally interesting but mostly coming from massing of the volume.

Patterns and Ornaments

Nikita Khrushchev's speech at the conference of Builders in 1954 ordered the building industry to not use decoration on the building because it does not have any practical function and on top of that it is unnecessary expenses. The extremely decorative style of Stalinist architecture fits this definition perfectly with excessive use of ornament and elements which were from expensive materials and extremely labor-intensive to produce. I guess this has been the general rule but since It has been nearly impossible to build anything without the approval of a party or some specific commission connected to the state, they were obvious exceptions. Exceptions for higher-profile buildings as communist party headquarters or public buildings are logical. But there are also geometric ornaments to be seen on normal residential buildings. There was still some ideological room to maneuver and decoration of buildings has been done by abstracted or rather geometrical ornaments

This kind of ornamentation can be seen much more in the former Eastern bloc compared to the west, where facade ornaments, in general, are much harder to find. Interesting is the relationship of western modernism and socialist modernism to the ornament and decorative elements. Because they might be starting from a similar position, but ornamentality as such is approached in a very different way.

Since Adolf Loos as big theorist of modernism presented his essay Ornament and Crime (Loos,1923), modern architecture gradually lost its ornamentality in favor of materiality and so-called cleanliness. He argued that ornaments are excessive, wasteful and they tend to go out of fashion quickly. Modern and later contemporary architecture gradually deleted most of the ornaments from its vocabulary and ornaments of any kind have been seen excessive and were not used much for a significant amount of time.

Algorithmic design

Algorithm Definition
An algorithm is a set of instructions designed to perform a specific task. This can be a simple process, such as multiplying two numbers, or a complex operation (Christensen, 2013)

Algorithmic Modeling.
A recipe is an informal example of this. It takes a set of inputs, called ingredients, manipulates them in specific ways, and produces a (usually!) edible output (Van der Leest & Nyhoff, 2005)

The use of algorithmic or parametric tools in architecture is wide and is continually on the rise around the world. Most universities and architectural practices see the potential of these tools in many fields of architectural design, from optimization or analysis to simple form-finding. The power of those tools is in my opinion not completely understood yet by the wider professional public and remains a topic for few which are taking on this challenge. The implementation of parametric workflows could reduce most of the repetitive tasks giving designers more time and space to design and also support their design choices by actual data rather than relying on intuition. Algorithmic design in my eyes is a continuation of the development of means of architectural production.

From my own experience, design reacting to change of parameters is exciting and it induces thoughts of the possibility of extending and changing the given algorithm to observe further changes.

Contemporary parallels

When starting my diploma thesis I realized that some of the renowned practices and studios are using abstracted geometrical elements to enhance the visual qualities of facades in their designs which also could be seen ornamental. Interestingly, I also found out similarities of ornamental features used on facades of Socialist Modernism and in the facades of the most recent contemporary practices. The use of ornaments, the abstracted geometrical elements, can be also practical. There are already examples of using ornamented shading elements or using them as a base for vertical vegetation.

On the following page, I present several examples of the use of ornamental features on facades in contemporary architecture. Many of them depend on the same geometrical principles as the facades which I study in my diploma work and are presented later in this thesis.

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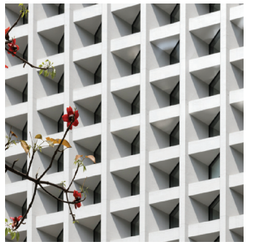
b 

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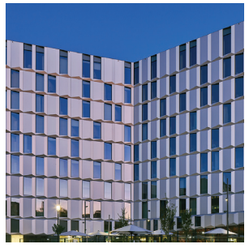
h 

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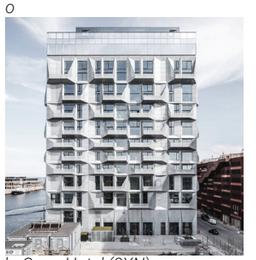
o 

p 

a, b Ragnarock (Cobe, MVRDV)
c Murray Hotel (Foster + Partners)
d Urban Creme Hotel (r15)
e Kuopio City Theatre (ALA Architects)
f Charging station(Cobe)
g Middelfart Savings Bank (3XN)
h Grow Hotel (3XN)
i Aqualuna (3XN)
j VM Houses (BIG, JDS)
k, l Bodo city hall (Lorentzen Langkilde)
m, n NorraTornen(OMA)
o, p Silo (Cobe)

Part one

Analysis

Gathering material and sorting system

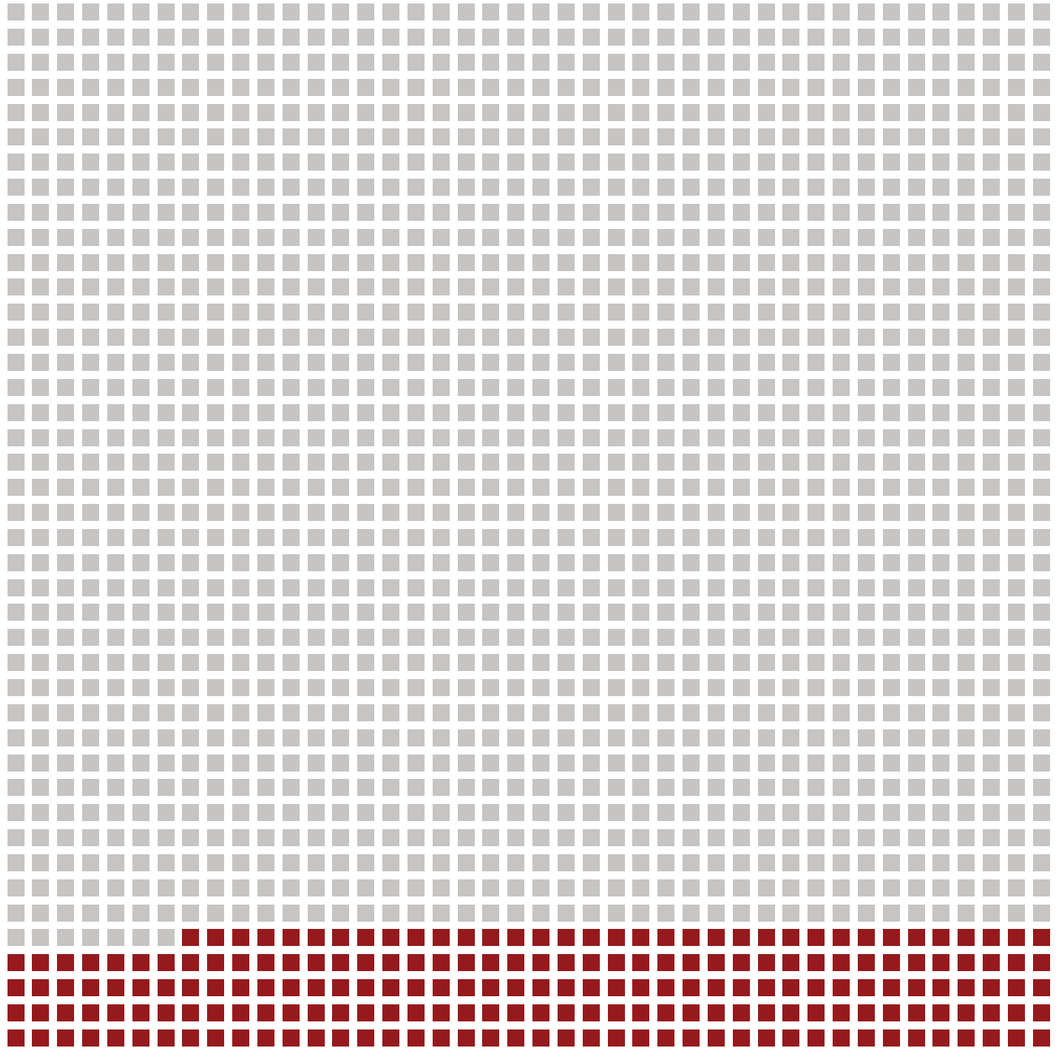
Gathering material for my diploma thesis started by familiarising with databases and sources to find buildings and their facade images for the further analysis. The very first step was to read the book Socialist Modernism in Romania and Republic of Modova (Asociatia Birou Pentru Arta si Cercetare Urbana, 2017,) I bought even before I started this thesis just from my interest.

During gathering material, I decided to go through the databases country by country and I have been using current borders of countries to specify more closely the position of those buildings both for better mapping for my future travels and mainly because a lot of the countries do not exist anymore like Yugoslavia. Three main web databases I sourced used pictures from were . Soviet Modernism 1955-1991(Architekturzentrum Wien, 2013), ostarchitektur.com (Sägesser,2006) and Socialist Modernism Facebook page photo gallery (Art and Urban Research Bureau, 2014).

It is important to note that I am aware that I might have missed some buildings. This might be either because they haven't been documented in the sources and databases I was using or the buildings have been destroyed already without being documented. Another challenge was that despite of being well documented in historical books, I did not have access to them. In addition, quite often the text was in Russian and I don't understand Russian however my limited knowledge of Crylics has been helpful many times during my research.

To conclude this process, I made a small analysis to estimate how many buildings I have seen and how many buildings I have recognized as potential material for my further work. I went through 27 countries of the Eastern Bloc. Since some websites and databases were overlapping, I estimate that I have gone through between 1700 and 1800 buildings from the era between 1955 until 1991. All together I selected 203 buildings according to the criteria which I will present below. That means that from this extensive research I choose just 11-12% of buildings to use further in my analysis of facades and further work.

When gathering the images, I found out the need to create a system to organize references and management of sources easier. I started with making folders according to current countries in which buildings are. Since aiming to gather multiple photos of one building/ façade, to make my work with understanding the shapes better, I started naming pictures with code names which are composite of country sign and number (see the table on page 27) to make mass selection and searching for examples easier. Since the diploma work has academic character, I realized the need to pay attention to sources and authors of the photos to prevent working in the end retrospectively. Therefore, I enriched my workflow of downloading pictures by loading them into Adobe Bridge and changing the metadata of each picture to the author of the photo and the source website. Thereby, I have information about the images embedded right into the file and I did not need any extra table to match the photos with their author or source information.



Representation of evaluated (all) and selected (red) examples

Country	***code***	***No. of selected***	***No. of evaluated(aprox.)***
Armenia	*A*	11	88
Azerbaijan	*AZ*	4	39
Belarus	*BE*	2	94
Bosnia	*BO*	1	27
Bulgaria	*BU*	2	29
Croatia	*CR*	3	69
Czech	*CZ*	6	45
Estonia	*EE*	2	81
East Germany	*DE*	37	159
Georgia	*GE*	5	86
Hungary	*HU*	14	177
Kazakhstan	*KZ*	10	30
Kyrgyzstan	*KG*	3	41
Latvia	*LV*	4	54
Lithuania	*LT*	3	86
Macedonia	*MK*	2	28
Moldova	*MO*	15	48
Poland	*PL*	11	59
Romania	*RO*	17	112
Russia	*RU*	13	34
Serbia	*SRB*	2	53
Slovakia	*SR*	1	18
Slovenia	*SL*	2	27
Tajikistan	*TJ*	5	30
Turkmenistan	*TK*		20
Ukraine	*UA*	15	171
Uzbekistan	*UZ*	13	65
			0
Total		203	1770

Analysis of selection and used country codes

Background features

There are few important background features affecting the amount and quality of my findings. First, there is a question of how well which area is covered in various sources. The European part could be mapped better than central Asia because of easier access for the researchers and photographers, due to the cultural and language issues. While studying the databases, I noticed that not all the countries did have the same amount of Socialist Modernism architecture. Of course, it was logical because the development, needs, and economic conditions varied country by country. It seems that there are three main reasons to build more in the given place or state concerning either destruction or development: industrialization, postwar reconstruction or natural disasters

Industrialization

Many countries have been sparsely populated or underdeveloped (measured by the general European standards) by the time they have been added to the Eastern Bloc. The Soviet Union took pride in building housing and industrializing countries for various reasons including scaling the number of resources which the country could provide to the Soviets (mostly mineral resources).

Postwar reconstruction

Second world war took place in a lot of different locations; however, some were damaged by war more than the others. This especially applies to big cities in East Germany and in many cities in Eastern Europe which took damage from fights on the Eastern front. Also, the Allied bombings of factories and cities made significant damage to the built environment in countries occupied by the Nazis. My assumption is that in those places the concentration of buildings built in socialist modernism style is higher.

Natural disasters

On 26nd of April 1966 there was a strong earthquake in Tashkent, and it destroyed a significant part of the city. Most of the historical Old Town with old Islamic style was destroyed, resulting in 300 000 people homeless. It has been the starting point of unapareled rebuilding efforts. These events stimulated massive rebuilding projects and changes in urbanism towards modernistic policies as well as further industrialization. This is one most significant example by its size, when damaged cities were rebuilt in the style of Socialist Modernism.

Selection criteria

When browsing the databases for searching the facade candidates, I realized that the selection criteria was needed to optimize the selection process and to provide myself guidelines to make the sorting and evaluating more logical and thereby easier. The selected facades are matching most of the given criteria, but not necessarily all of the criteria at the same time. Also, it is important to note that I have a strong focus on being analytical and created rules which should help me with deciding. However, the final collection of facades, which I recognized as the chosen ones to have the potentiality to be used further, still reflects my personal preferences. But since visual preferences are always subjective and I use the findings as to the inspiration for the second part, I assume this approach is acceptable.

Also, the set of rules which I created might seem to be vague and unclear. However, it is important to understand that the facades I work with are so different from each other, that if the criteria would have been more specific, I might have lost many valuable examples to study.

In the following page, I present the selection criteria for facades and their properties.

The elements of the façade need to be plastic with a certain level of complexity.

The facades can differ in the scale of use of given elements, they can be used over the whole surface or just in small areas on the facade.

The size/scale of evaluated elements can differ, the geometrical shape is important.

The façade needs to have interesting ornamental properties according to my preferences.

Façade elements need to be fitted in a grid or there must be certain observable rules of repetition.

Just division of flat surfaces or window division by elements is not enough to nominate facade for my further work.

The structural function of the facade element varies, but in most cases, the structural function is not crucial.

Façade elements must have geometry where you can define processes and steps in order to create such shape.

Selection criteria for facades and their properties

Creation of geometric families

Gathering and sorting the image material according to the countries seemed to be a logical and consistent system of progression to cover as many interesting examples as possible. Also, it provided me interesting data about the concentration of certain types of buildings and regional differences and deviations from the typical style.

One of the main driving forces behind the starting the gathering process was the idea of obvious similarities of socialist facades. However, during the gathering stage, I broadened my understanding about the existing similarities and geometric families. Therefore, I decided to create a genealogic tree of the selected Socialist Modernism facades and their relationship with each other.

In addition to this family tree structuring, I integrated the parametric analysis to it, to better understand what properties of the facades are shared and how the changes in their parameters would affect the shape of single elements i.e. to understand the way how the façade looks and works as a whole. This tree would work as a tool for both me and the reader to orient in a relatively large volume of data.

When structuring the family tree, I went several times through the all photos, and then I started slowly building the categories and subcategories of geometrical sorting. First, I wanted to go strictly with the shapes of the given element, but then I realized that it would leave me with very large groups which would be difficult to break down into smaller families. Also, comparing facades from completely different groups would be difficult since e.g. rules which can be seen in facades with balconies do not always apply on facades with more freeform ornaments.

Therefore, I decided to have two basic facade groups based on their dependence on structural elements: Ornamental facades and Structure dependent facades. Ornamental facades are not dependent on the structural elements as the windows, balconies, or other such elements. In the Structure dependent facades the ornamental element are either the structural element itself (in case of balconies) or directly dependent on the given element (decorative extension the window frame).

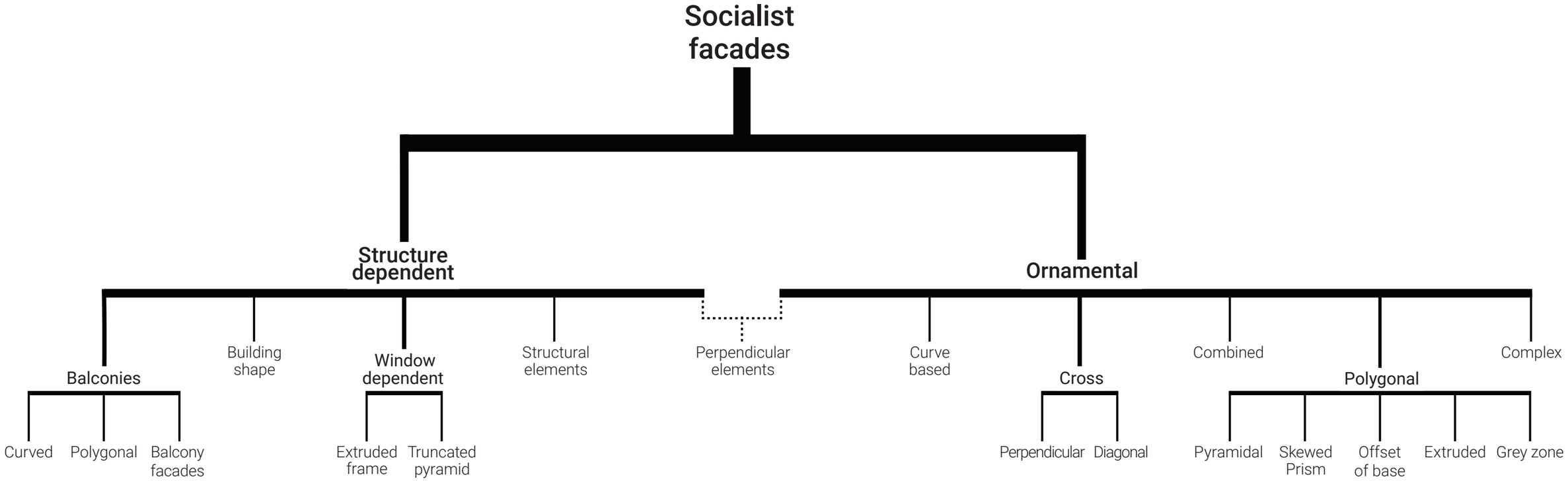
The further division was similar to the previous step. The workflow for this part was to identify common characteristics of the facades and to make sure that the chosen criteria was not overly specific to be able to group multiple items. It was also important to keep logical order and be systematic with the decision making. If any problematic facades occurred which would fit into multiple groups, it either signaled the need for reconsidering the current division of the groups, or after systematic analysis, the creation of a new family / branch if there were multiple facades with similar nominators.

I would like to note that there are probably many ways to sort given facades into separate geometric groups. I have come up with probably more than five systems that would fit this purpose. And I also had some tough decisions to make, because I did not know if the current sorting system does have any blind spots until I was deep into the sorting process. In addition, I realized during this process that there is no correct and incorrect way in this sorting stage, there are systems which probably work better or worse for a given final purpose. With this in mind, my aim was to create sorting which is in my eyes most practical and logical for my purpose. But still, the sorting is based on my perception of given shapes and geometry.

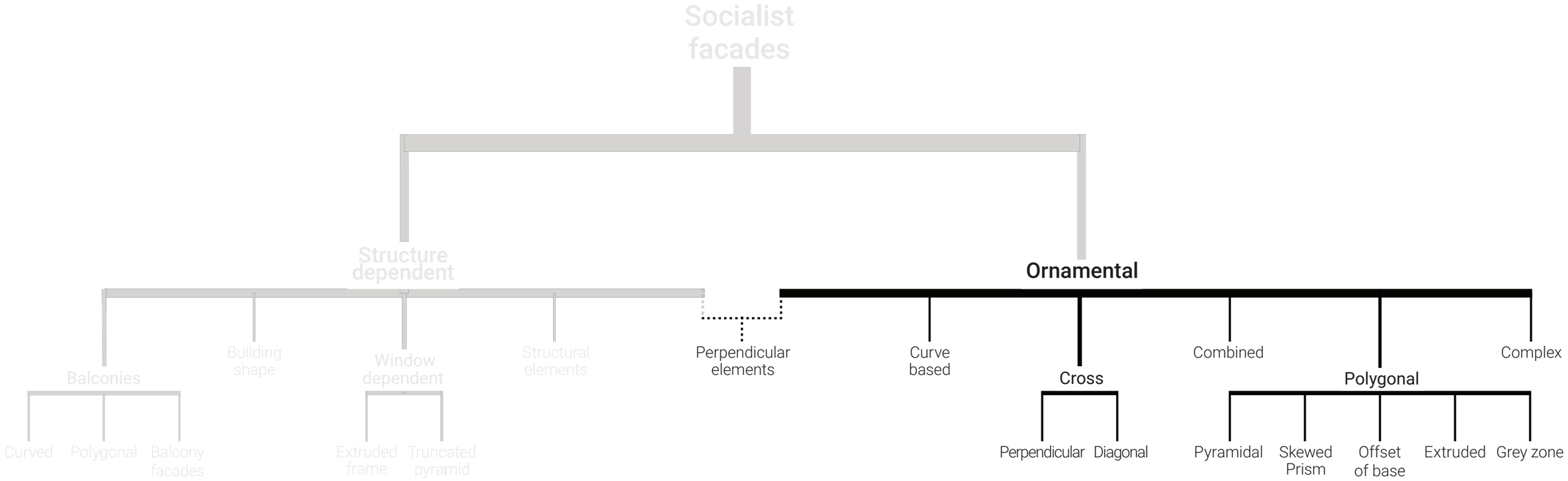
Analysis of defining parameters

The analysis of defining parameters to each geometric family brought one more layer to the process of grouping of the facades. The goal was to analyze groups of shapes and define the main parameters as length, width, or amount of displacement which can be used in the creation of an algorithmic definition of the whole family. The majority of examples shown in the family list could be parametrically recreated using listed parameters, while just changing input variables. However, not in all families was this goal possible. In some facade families, the nature of the presented geometry was so different from each other that the parametric analysis fitting most of them would have been impossible. In addition, the parameters describe only the basic features and are to a certain degree abstracted to keep universality of the family.

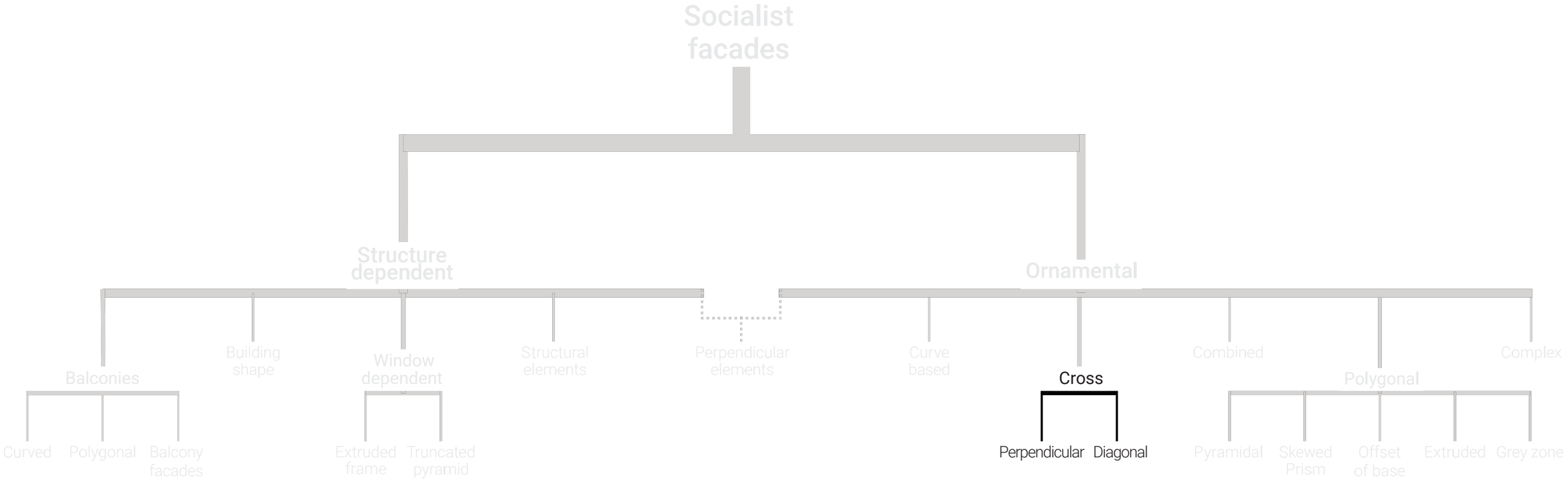
Generalogic tree of facade families



Ornamental facades

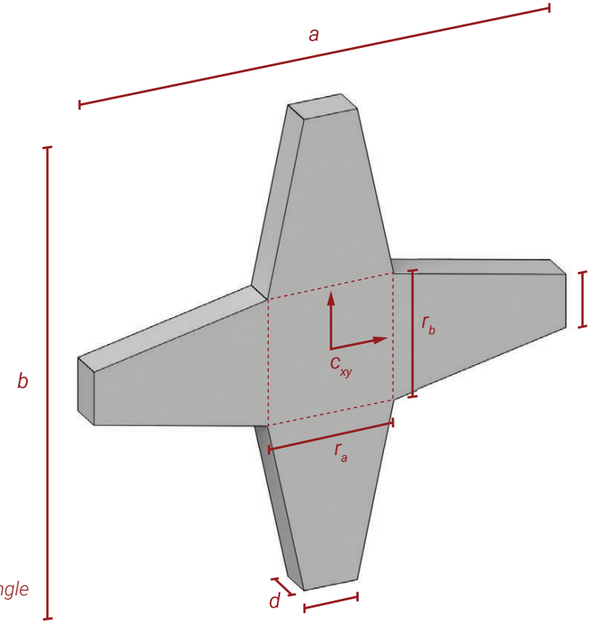


Cross based facades



Perpendicular cross facades

Perpendicular cross facades consist of cross elements inscribed in rectangular cell with arms being perpendicularly oriented to the sides of the cell. Lines of contact with varying length are connected to the corners of guide rectangle. This rectangle can be moved along the two axes of the base cell, as well as scaled in either direction. Then resulting shape is extruded outwards to desired depth. The top surface can be flat or faceted.



a	*Lenght*
b	*Width*
d	*Depth*
c_{xy}	*Position of guide rectangle*
r_a; r_b	*Size of guide rectangle*

1.

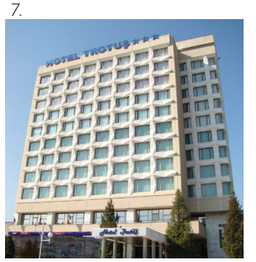

2.


3.


4.


5.


6.


7.


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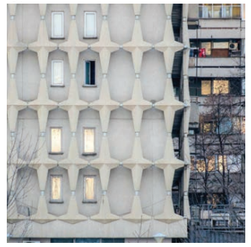

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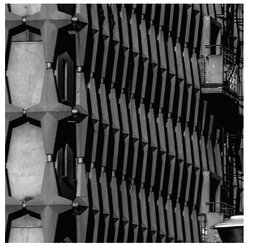
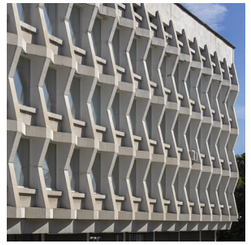
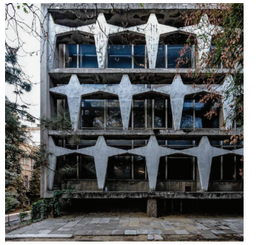


12.


13.


14.


15.


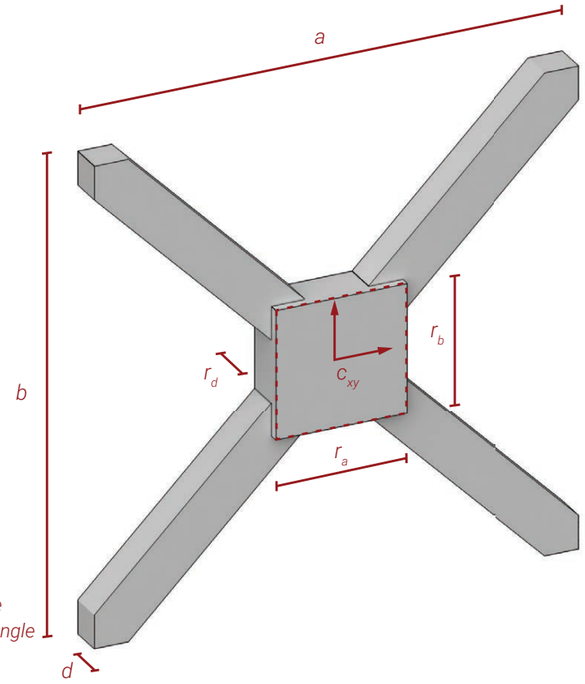
16.


1., 2. A8 flats
3., 4. LT03 Karoliniškės microdistrict
5., 6. RO09 Romanian Television building Bucharest
7., 8. RO11 Hotel Trotus Onesti

9. - 11. RO12 Romtelecom building Bucharest
12. ,13. RU11 State Pedagogical University ULyanovsk
14. - 16. UA03 Institute of Marine Engineers Odessa

Diagonal cross facades

The family of Diagonal cross facades is defined by the cross element connecting corners of the rectangular cell with the corners of the guide rectangle. Guiding rectangle can be shifted along the plane of the façade. This element can be extruded to the depth of cross arms or independently also there are facades where guiding rectangle is replaced by meeting point of arms. Profile of arms can vary.



a	*Lenght*
b	*Width*
d	*Depth*
r_a; r_b; r_d	*Size of guide rectangle*
c_{xy}	*Position of guide rectangle*

17.

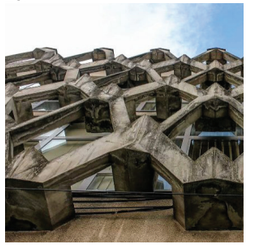

18.


19.


20.


21.


22.


23.


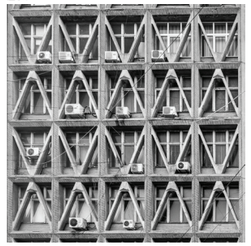
24.


25.

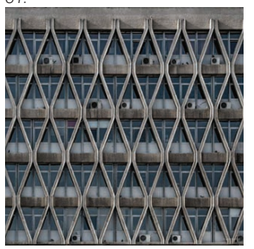

26.

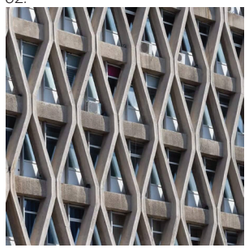

27.


28.


29.


30.

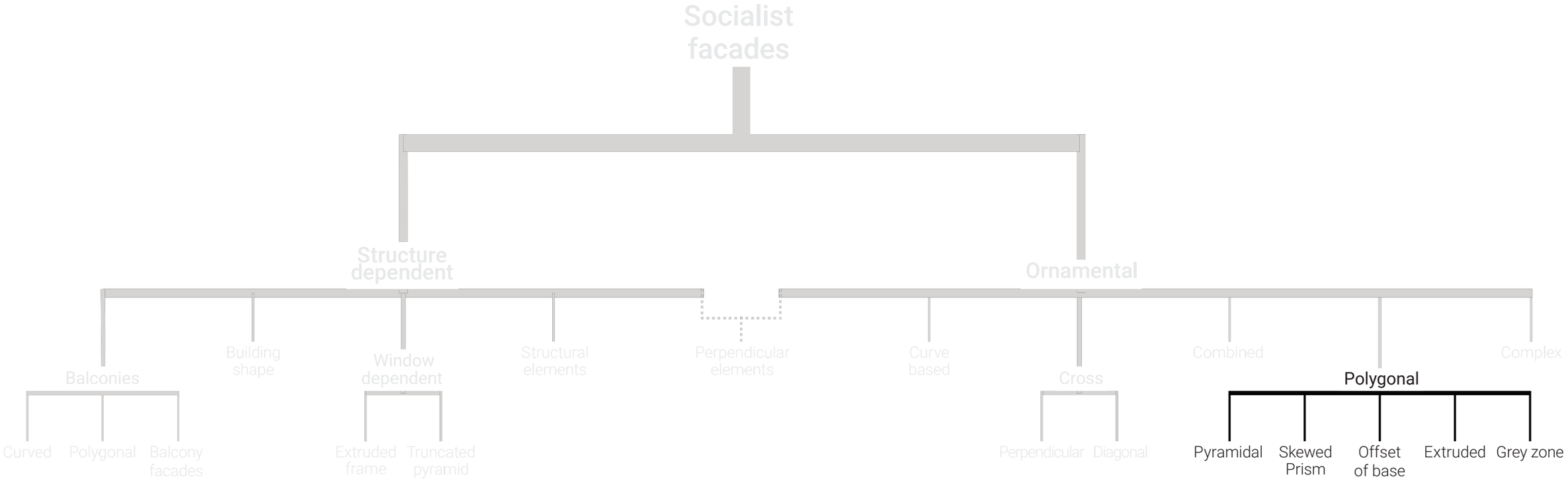

31.


32.


17.-19. KZ04 Communication Center Alamty
20.-24. RO03 University library (Cluj-Napoca 5)
25. -27. RO06 Sugar factory HQ Buzau

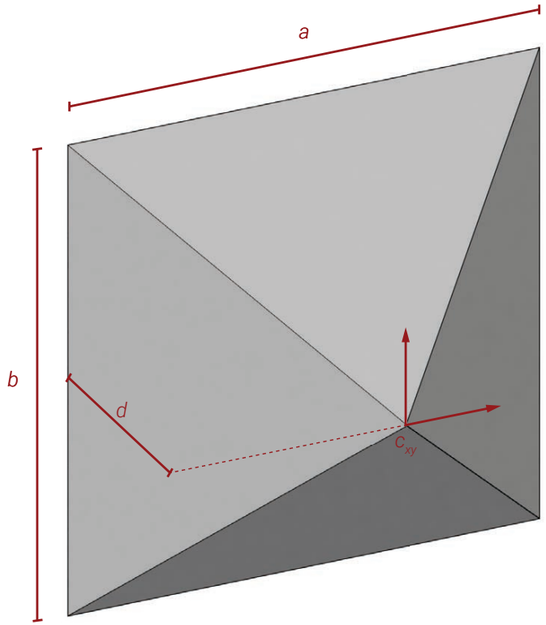
28.-30. RO07 Consproiect Building Ploiwesti
31., 32. RO13 Munplast building Bucharest

Polygonal facades

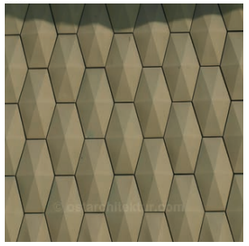


Pyramidal facades

Pyramidal facades are defined by base polygon, usually rectangle, triangle or hexagon. Sides of the base polygon are connected to the apex, defined by its position along the axis of base cell and by its displacement from the base. The resulting pyramid can be either concave (displaced outwards) or convex (displaced inwards).



a	*Width*
b	*Height*
d	*Depth*
c_{xy}	*Position of the apex*

33.


34.


35.


36.


37.

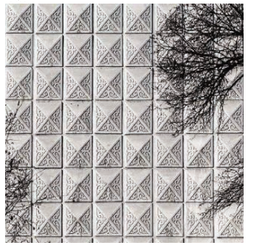

38.


39.


40.

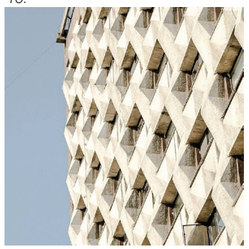

41.


42.


43.


44.


45.


46.


47.


48.

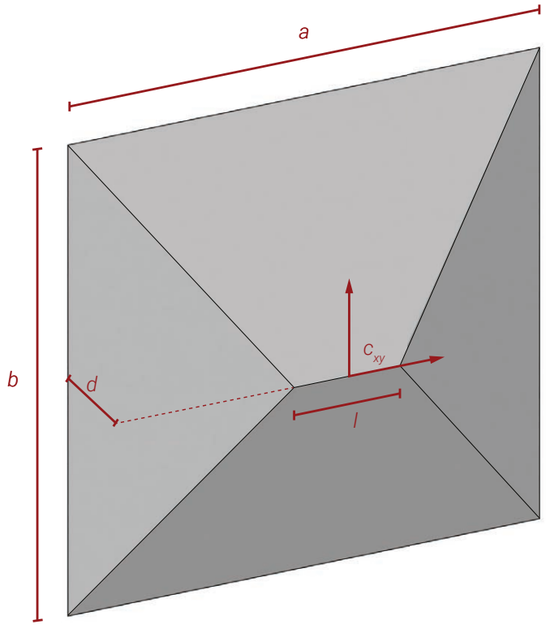

33., 34. CR 01 Austrian pavilion
35., 36. DE09 Robotron
37. DE11 SED-Bezirksparteischule
38., 39. DE18 Housing

40., 41. KZ05 Lenin Palace Almaty
42., 43. KZ10 State Archive Almaty
44. RO10 Gheorghiu-Dej Sport Hall Onesti
45., 46. RO14 Hotel Traian Braila

47. TJ02 House of Pol. Education Dushanbe
48. UA11 Roofed market Gitnie

Skewed prism facades

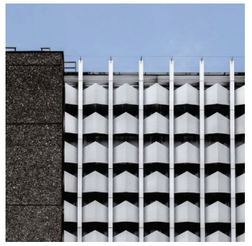
Skewed prism facades are defined by triangular prism with one side matching the base cell of element. The remaining side can be moved in both directions of base cell and extended away from base side; the length of this side is variable. Resulting shape can be pointing away from the façade as well as inwards.



a	*Width*
b	*Height*
d	*Depth*
c_{xy}	*Position of the top edge*
l	*Lenght of top edge*

49.

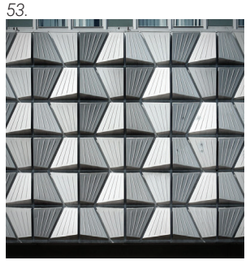
50.



51.

52.

53.

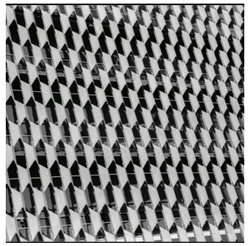


54.

55.

56.

57.

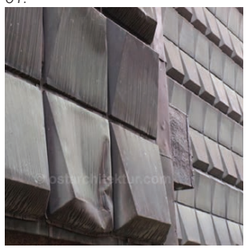


58.

59.

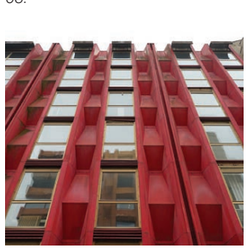
60.

61.



62.

63.



64.

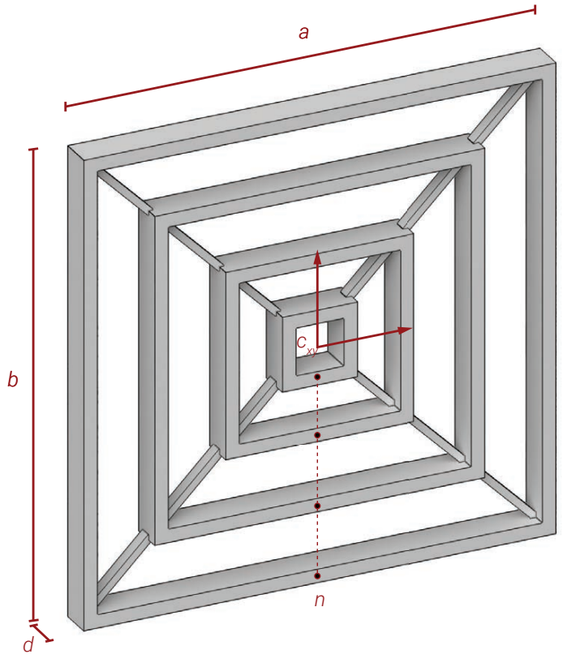
49., 50. DE01 Ministry of Stasi
51., 52. DE20 Cent. Warenhaus Magdeburg
53.,54. DE33 Cent.Warenhaus SchwedtOder
55., 56. DE35 Stadhalle Cottbus

57. DE36 Centrum Warenhaus Berlin
58., 59. HU08 Kelet dept. store Nyirégyháza
60. HU14 Szabolcs Dept. store Kisvárda
61., 62. LV01 Museum of occupation Riga

63. SL02 School Ljublana
64. UA02 Cirkus dnjepropetrovsk

Offset of base shape facades

The family of facades consists of base shape, which is offset multiple times toward the cental member, which can be shifted along the plane of the façade. Resulting group of shapes extrudes perpendicularly from the façade. Usualy elements are connected by supporting structure.



a	*Width*
b	*Height*
d	*Depth*
c_{xy}	*Position of final offset*
n	*Number of offsets*

65.

66.

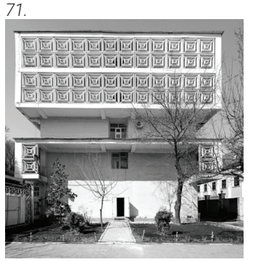
67.

68.

69.

70.

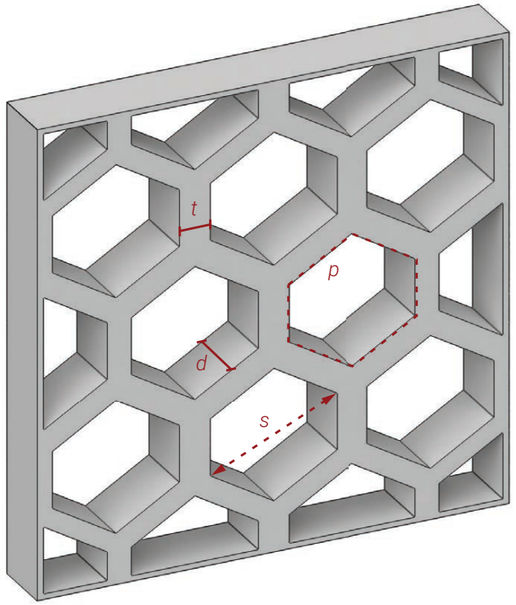
71.



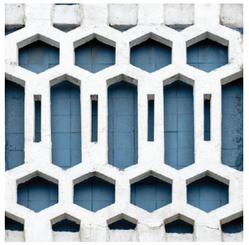
65., 66. TJ05 Ministry of Industry Dushanbe
67., 68. DE28 Rundkino dressden
69.-71. SRB01 Politika Tower Belegrad

Extruded geometry facades

This broad group of extruded geometry facades is defined by pattern of geometric ornaments, usually polygons, that are extruded to desired depth. Thickness of extrusion walls varies as well as framing of whole element. These elements can be seen in varying scale of the basic geometry.



p *Base shape*
t *Thickness of extrusion*
s *Scale of base element*
d *Depth*

72.


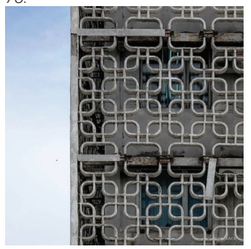
73.


74.


75.


76.


77.


78.


79.

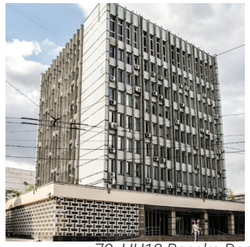

80.

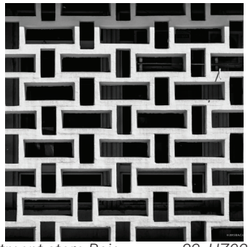

81.

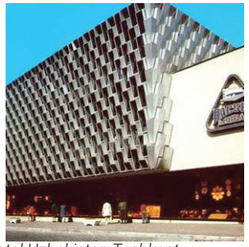

82.


83.


84.


85.


86.


87.


72. AZ04 Teachers' Institute Baku
73., 74. BO1 Oslobodjenje
75. DE16 Housing complex Halle neustadt
76. DE04 House of state
77. HU01 Residental building Budapest
78. HU13 Bacska Department store Baja
79. MO10 Institute of Technology
80. RO01 Kino Kosmos Brasov
81. TJ04 Writers' house Dushanbe
82. UA04 University Physics dept. Kyiv
83. UZ02 Hotel Uzbekistan Tashkent
84. UZ06 Lenin Museum Tashkent
85., 86. MO11 State Bank
87. HU13 Bacska Department store Baja

Grey zone of Polygonal facades

In this family are the facades which have not fit in any of previous categories or have features of multiple members of polygonal family. There have been multiple geometrical approaches applied to the element to achieve final shape.

Example in images 87.-89. Is mimicking three-dimensional plasticity of skewed prism faces just by effects on flat metal panels. In images 92. and 93. is shown concave pyramid and extruded box. In images 95.-98. is is basic geometry skewed prism on which has been applied inward extrusion of offset shape.

88.

89.

90.

91.

92.

93.

94.

95.

96.

97.

98.

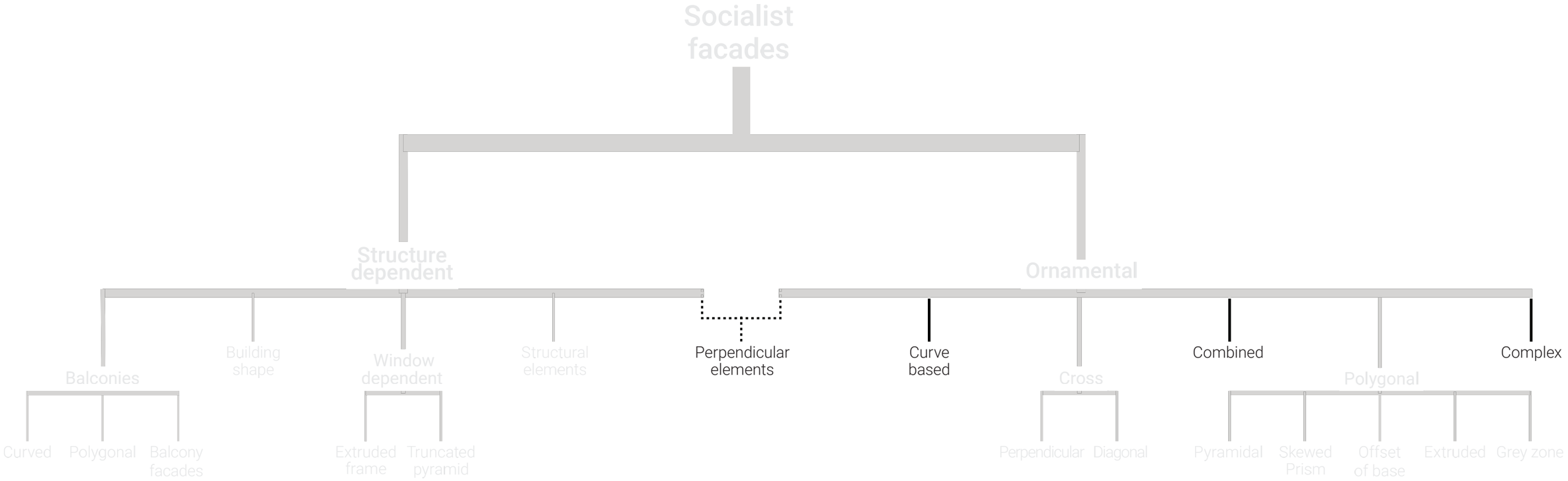
99.

100.

101.

88.-90. DE17 Konsument Warenhaus Leipzig
91., 92. HU03 Residental building Budapest
93., 94. HU11 Skála shoping center Székesfehérvár
95. MK01 Communist party HQ
96.-99. RO05 Aula Magna hall Timisoara
100., 101. UZ12 Turkistan Concert Hall Tashkent

Other ornamental facades



Curve-based facades

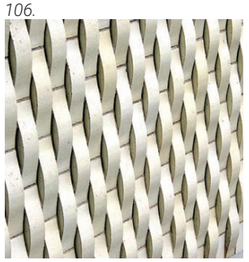
The curve-based facades are defined by use of curves or curved elements. In this family there is problem with recognition of shared defining parameters, because of vast differences of how and which curves are applied in creation of façade elements. Although this group can be further broken down into categories based on the plane of application of curve in plan, plane of façade or perpendicular to it, but that would result in groups too small to name shared properties between number of facades. Therefore it is not possibleto provide abstracted diagram of façade parameters.

102.

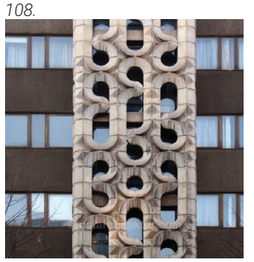

103.


104.


105.


106.


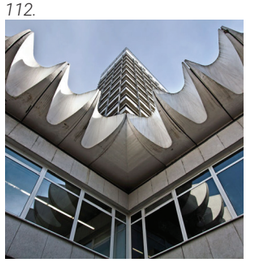
107.


108.


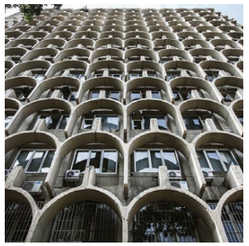
109.

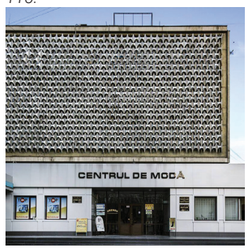

110.

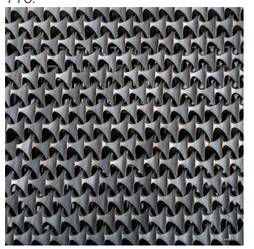

111.


112.


113.


114.


115.


116.


117.

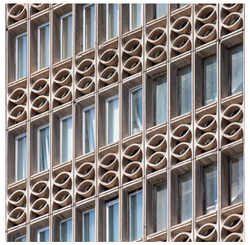

102. A9 fence of hotel Dvin
103.,104. CR 02 Slovenian pavilion
105. DE08 Hotel Newa
106. DE10 Robotron
107. UZ11 Experimental Plant Samarkand
108.,109. DE19 Burohaus Liepzig Stassi

110. DE26 Unknown
111.,112. DE27 Haus des Reisens
113., 114. GE02 Residental building
115., 116. MO01 Fashion center
117. RU02 Housing Kaliningrad

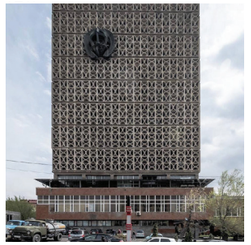
Combined geometry facades

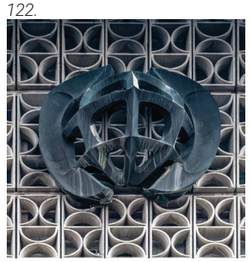
Combined geometry facades are compiled of two or more categories of ornamental facades. In these facades was quite often used base of base polygon to which was inserted other geometrical shape or its parts. Also, in some facades is used rotation of every second element as way to extend visual language without need creating another variant of façade element.

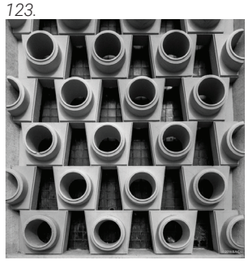
118.

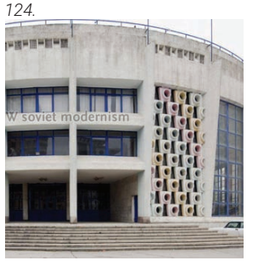

119.


120.


121.


122.


123.


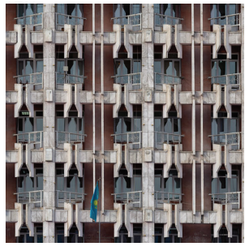
124.


125.


126.

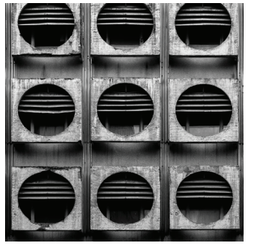

127.


128.


129.


130.


131.


132.


133.


118.,119. A12 Centre for Geodesics and Cartography
120.-122. A3Automatic Long Distance Telephone Station
123., 124. AZ02 State circus Baku
125., 126. DE12 Schule typ Erfurt

127. GE04 Busstop
128.,129. KZ01 Al-Farabi Kazakh National University Almaty
130.-132. MO07 Parliament Parking
133. UA01 Apartment building Kharkiv

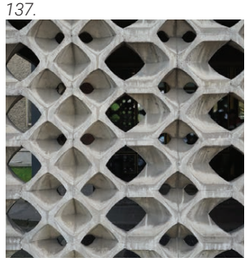
Complex geometry facades

The basic shape of complex geometric facades is either not obvious at the first glance or is so complicated that there is no general nominator. This group contains facades, which elements cannot be described with basic shapes and their transformations, there are for example complex curved surfaces or complex ornamental extrusions.

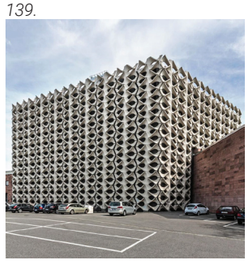
134.

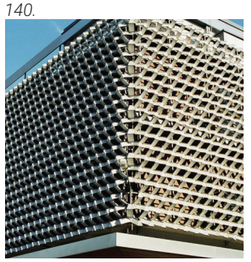

135.


136.


137.


138.


139.


140.


141.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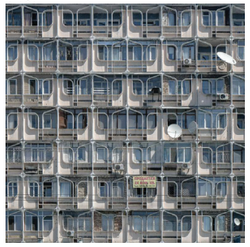
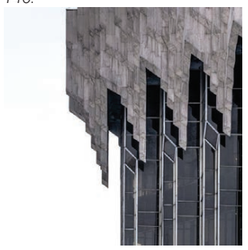
143.


144.


145.


146.


147.


148.

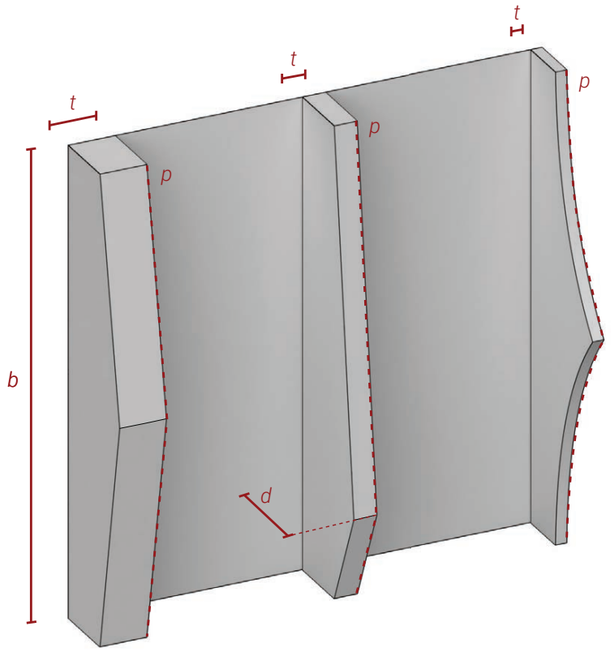

149.


134., 135. A5 Sportkomplex
136., 137. DE02 Ministry of stasi
138., 139. DE03 Cityhall chemnitz
140., 141. DE32 Centrum Werenhaus Suhl
142., 143. KG02 Apt. buildings Bishkek

144. KZ06 Wedding Palace Almaty
145., 146. KZ07 Khabar TV studios Almaty
147. RU13 Department store Kazan
148. UZ09 Palace of Friendship Tashkent
149. UZ07 Museum of the Friendship

Facades with perpedicular elements

This family is on the border between the structural based facades and ornamental ones. The elements have often structural character or are results of extending parts of building's structure, however they have ornamental qualities. They vary by profile of the element, its thickness and amount of displacement from face of façade.



b heigth
t Thickness of element
d Depth
p Profile of element

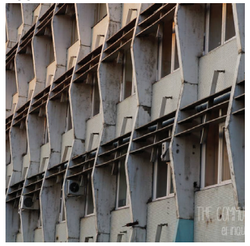
150.


151.

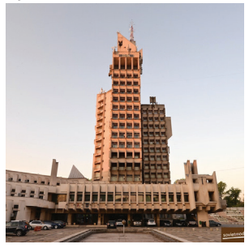

152.


153.


154.


155.


156.


157.


158.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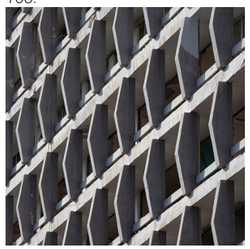
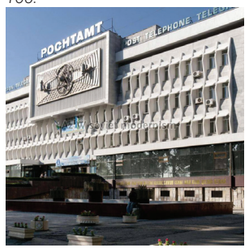
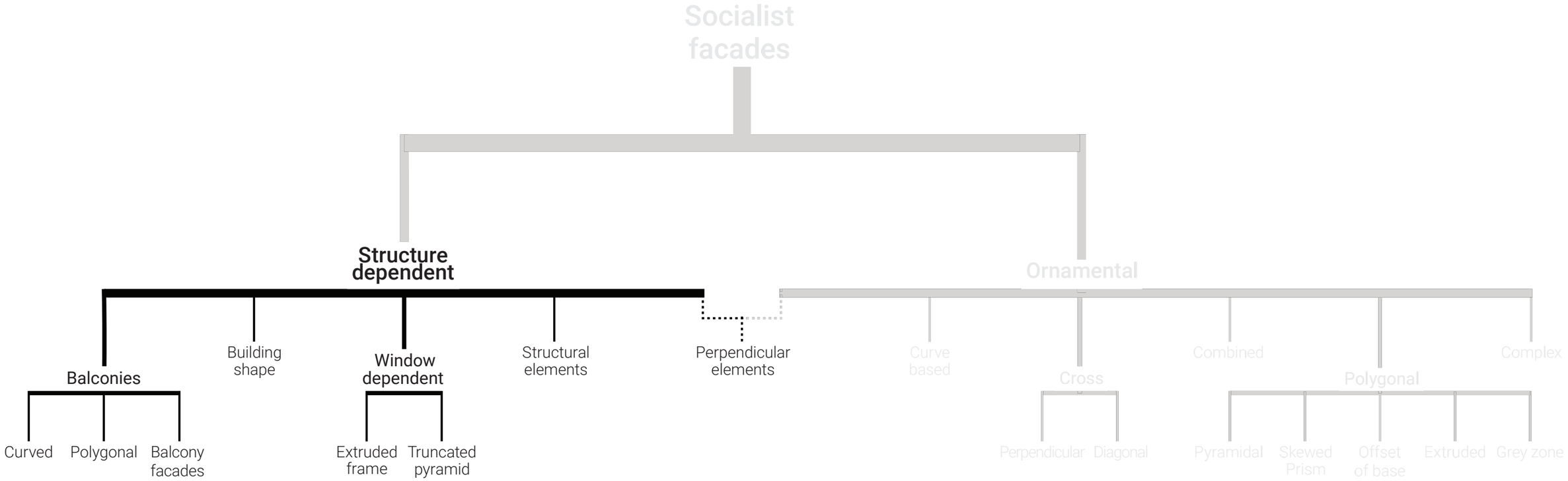
163.


164.

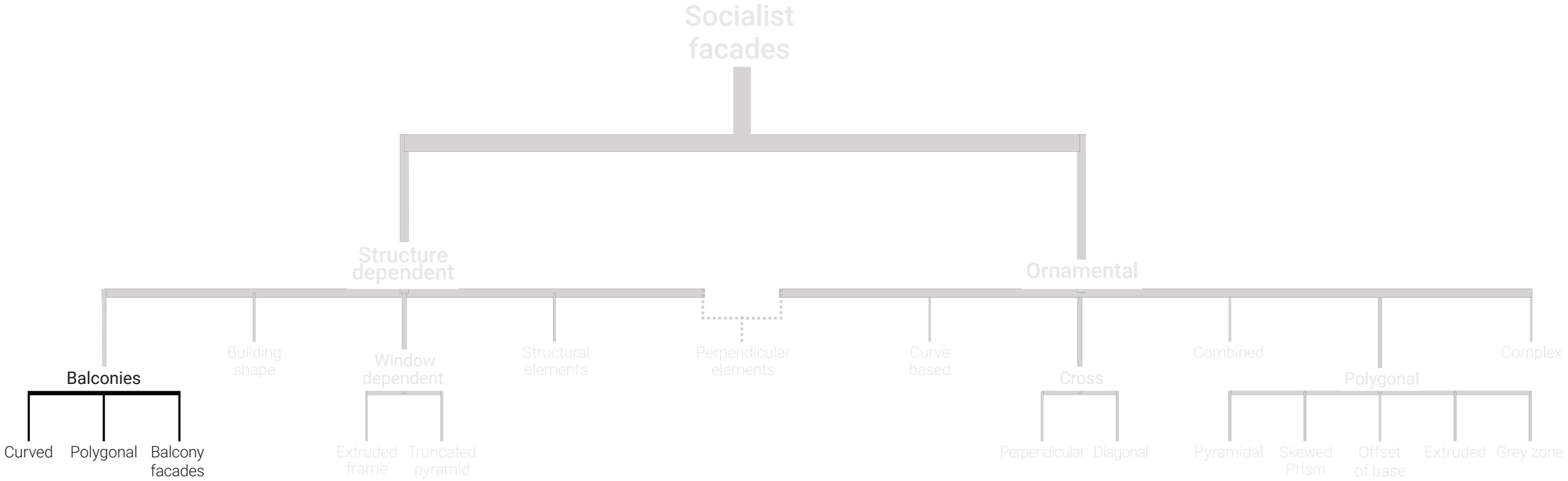

165.


150. A6 Afrykian culturehouse
151., 152. GE 01 Tibilisi technical library
153., 154. M004 House of Political Education
155. MO12 House of Science and Technology
156., 157. RO04 Administrative Satu Mare
158., 159. SL01 TGH-48 Garage Ljublana
160., 161. UA13 House of Pol. Education Dnipropetrovsk
162., 163. UZ01 State University
164. UZ05 House of Consumer
165. UZ08 Central Post Office Tashkent

Structure dependent facades

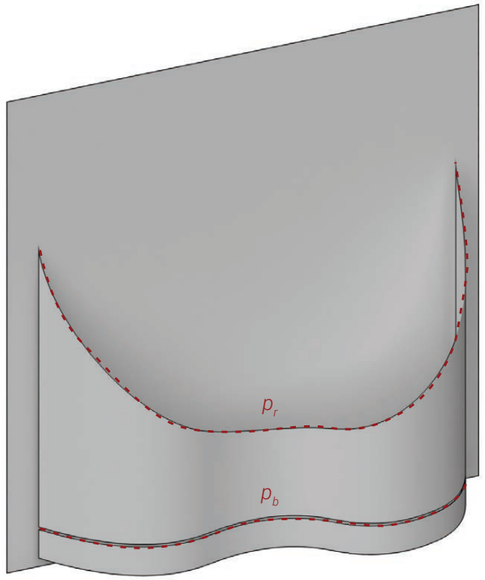


Balcony based facades



Curve-shaped balconies

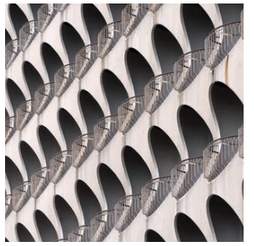
Curve-shaped balconies defined by use of curves in creation of the basic shape of the balcony slab and the shape of the railing in different planes. This curve ranges from polygons with rounded corners to more complex curves. The railing can be straight, or it can be shaped by projection of other shapes in the plane of the façade.



p_b *Base profile*
p_r *Profile of railing*

166.


167.


168.


169.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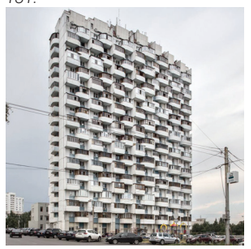
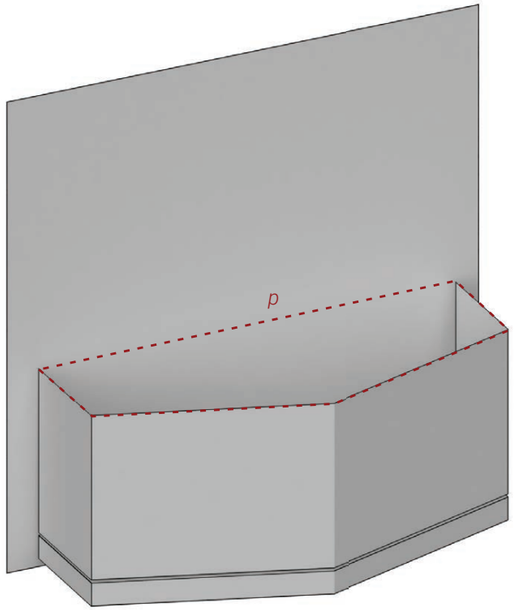
181.


166. A11 Palace of youth
167., 168. HU12 Ezustpart Hotel Siofok
169., 170. KZ03 Residential building Almaty
171.-174. MO05 Romashka Tower

175., 176. PL06 Housnig complex Manhattan Wroclaw
177.-179. RU04 Marine terminal St. Peterburg
180. ,181. RU12 Residential building Ufa

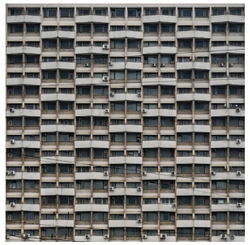
Polygonal balconies

Polygonal balconies are based on use of polygons as triangles, rectangles or pentagons as base for the slab of the balcony. Dimensions of sides and their ratio depends on given example. The base shape is usually followed by straight railing without profile. Balconies are usually bigger elements this group is most plastic of all shown facades.



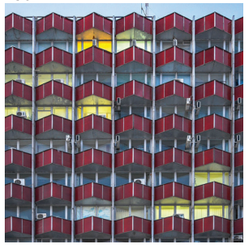
p *Base profile*

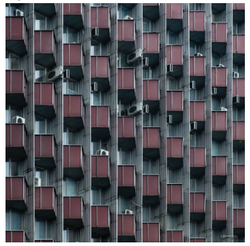
182.

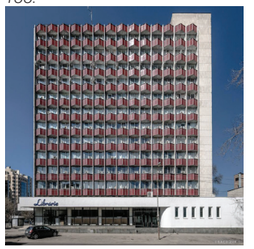

183.


184.


185.


186.


187.


188.


189.


190.


191.


192.


193.


194.


195.

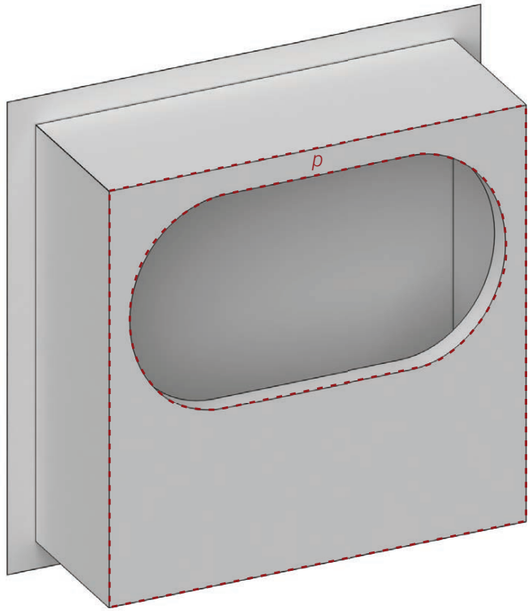

196.


197.

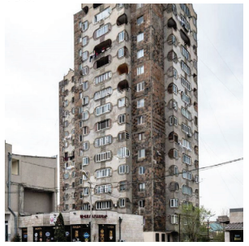

182. KG03 Residential buildings Bishkek
183.-185. MO02 Hotel Cosmos Chisinau
186.-188. MO03 Publishing house
189., 190. PL05 Apartment building Warsaw
191., 192. PL11 Housing building Warsaw
193.,194. RU05 Housing Moscow
195., 196. TJ01 Student housing Dushanbe
197. UA07 Accomodation for circus artists Dnipropetrovsk

Balcony facades

Balcony facades are dependent on frontal ornamental elements and cutouts placed on the façade covering built in balconies. Since the balcony is empty space, this step creates three dimensional patterns on the façade. Shapes and ornamentality applied to the balconies varies across the shown examples.

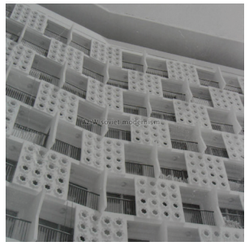


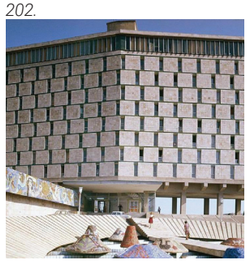
p *Shape of element*

198.


199.


200.


201.


202.


203.


204.


205.


206.


207.


208.


209.


210.


211.

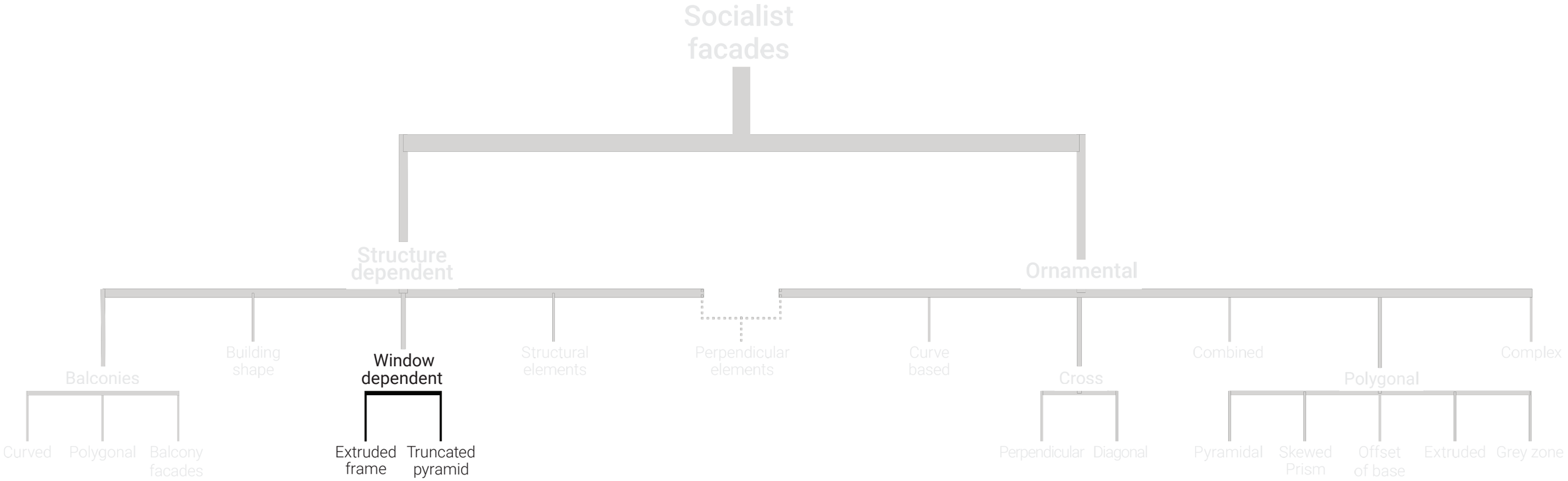

212.


213.


198.,199. A7 flats
200.-202. AZ01 Hotel Turist Baku
203.-205. GE03 Housing
206., 207. KG01 Hotel Osh-Nuru Osh

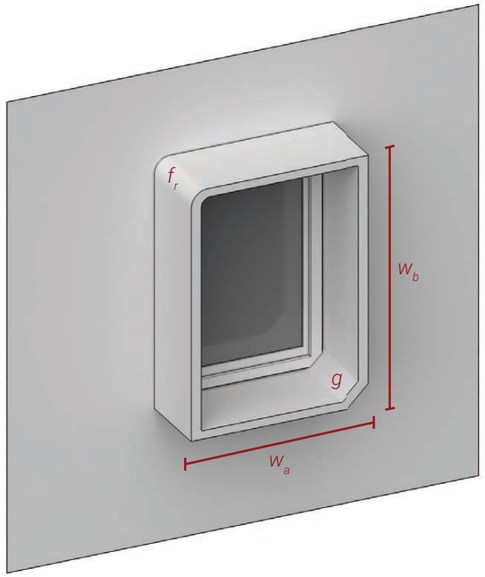
208.,209. UA08 Hotel Gradetskuj Chernigiv
210., 211. UA09 REsidental building Dnipropetrovsk
212., 213. UA10 Pobeda housing estate Dnipropetrovsk

Window dependent facades



Extruded window frames

In the family of extruded window frames are dependent on shape of the window and works either as window frame itself or as its extension. In majority of cases these elements have rectangular shape and their corners may be filleted or chamfered. The depth of the extrusion varies.



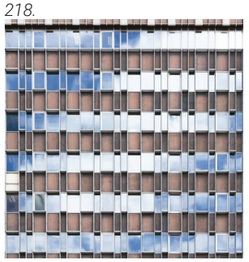
w_a *Window width*
w_b *Windowt height*
d *Depth*
f_r *Fillet radius*
g *Amount and type of chamfer*

214.


215.

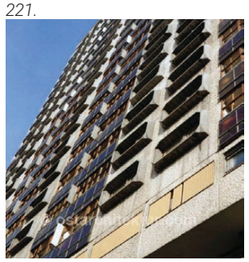

216.


217.


218.


219.


220.


221.


222.


223.


224.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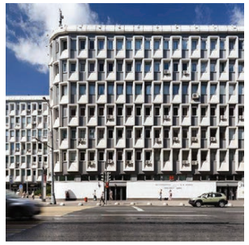
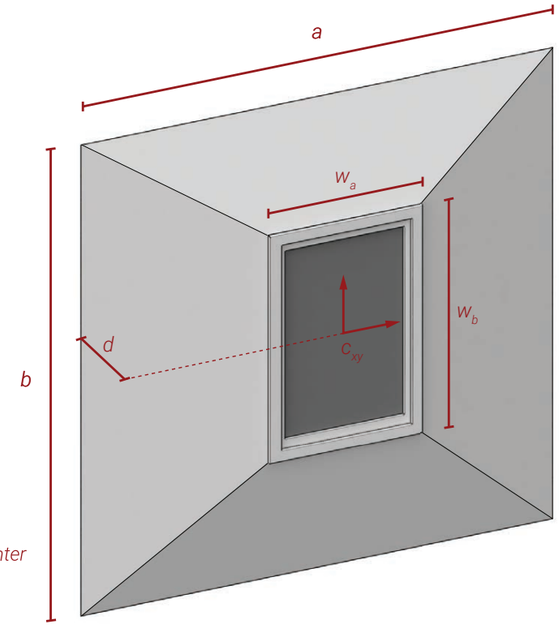
229.


214, 215. A1 Polytechnics Institut.
216., 217. CZ 04 Telephone station
218. CZ 05 Centrotex
219., 220. CZ 06 Comercical center Jested
221., 222. HU10 High risxe Pecs

223., 224. LT01 Unit of communication
225. PL01 Office building Gdansk
226., 227. RU03 TASS Moscow
228., 229. RU06 Metro office building Moscow

Truncated pyramid window frames

The family of truncated pyramid window frame isbased on moving the window perpendicularly to the facade face. The window frame is then connected with the base call with pyramidal shape which is cut off in order to create window opening. The center of the window may be moved along the plane of the base cell and change the shape of the segment of the pyramid. The resulting shape may be convex as well as concave.

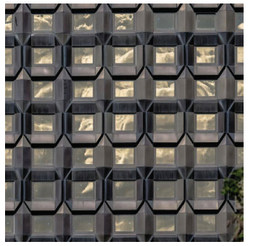


a	*Width*
b	*Height*
d	*Depth*
c_{xy}	*Position of window center*
w_a	*Window width*
w_b	*Windowt height*

230.

231.

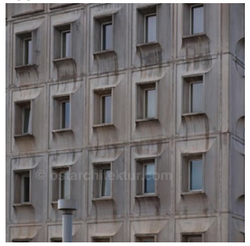
232.



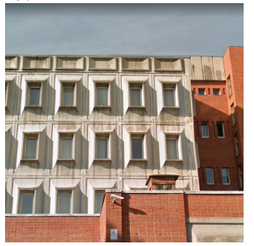
233.

234.

235.



236.



237.

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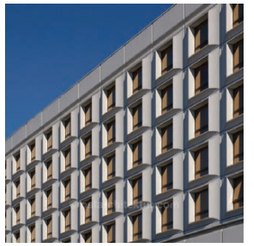
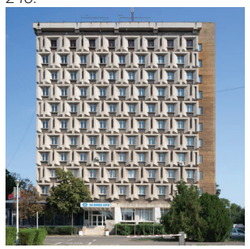


241.

242.

243.



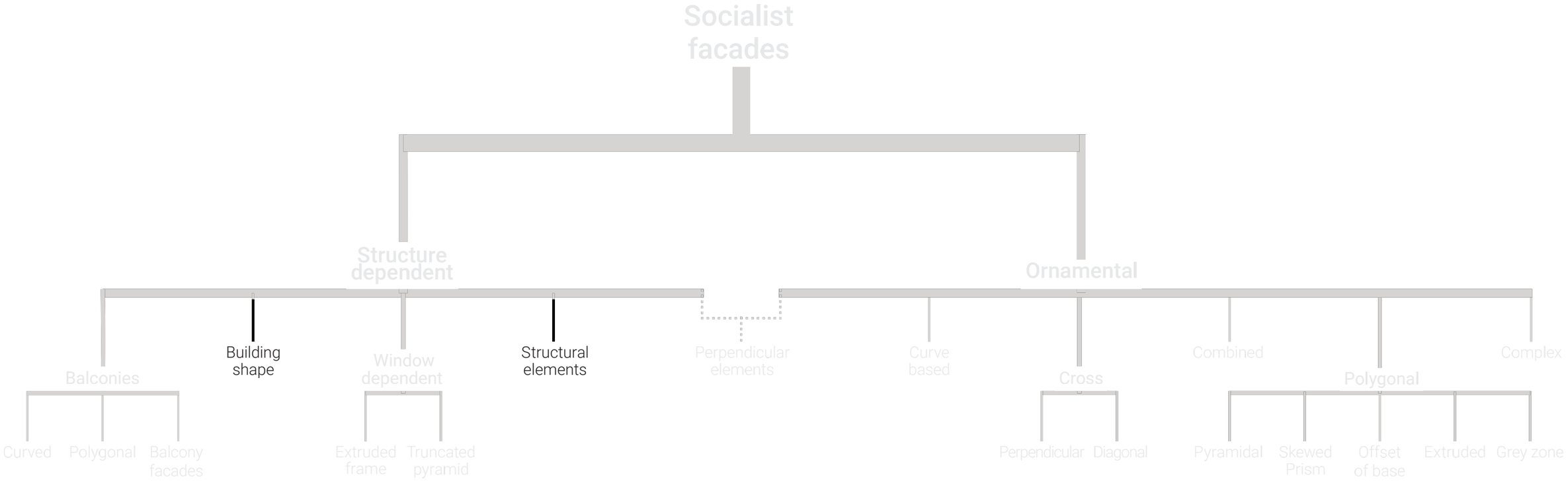
244.

245.

230. BE 1 belbytechprojeck
231., 232. BU 02 Hotel rodina
233. CZ 05 Centrotex
234. LT02 City Center Development Vilinus
235., 236. LV03 Office building Riga
237., 238. MK02 Post and telecom Skopje

239. MO14 Depatment store Calarasi
240., 241. PL03 Hotel Sofitel Warsaw
242., 243. RO17 Hotel turist Galati
244. RU01 House of Soviets Kaliningrad
245. UA15 Bus station Dnipropetrovsk

Other structure dependent facades



Facades based on building shapes

This family of building shapes belong to the grey zones of the sorting process. Even though I had as the criterium in my selection attributes that it is important to differentiate between building massing and facade I decided to make exception and present the most interesting examples of facades based on building shapes. .

In the family of building shapes the main source of ornamental features is the shape of the building itself. In most of cases interesting effects are achieved by layering built in and cantilevering volumes. Added volumes are usually relatively simple boxes containing windows or balconies.

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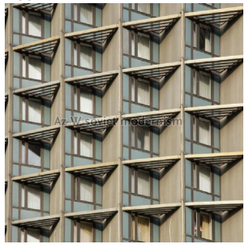
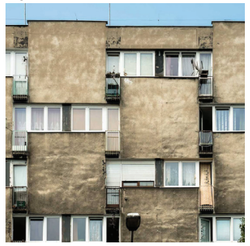


251.



252.

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255.

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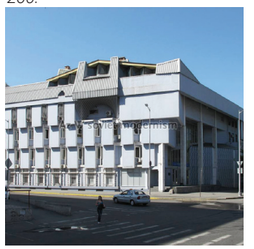
260.



261.

246. BE 2 Resitental
247., 248. BU 01 Housing block
249., 250. KZ02 Hotel Kazakhstan Almaty
251., 252. PL08 Housing building Wroclaw
253., 254. RU07 Housing St PEterburg
255.-257. RU10 Belokon building Samara
258., 259. UA05 Sanatorium Druzhba Crimea
260., 261. UA14 Regional court Dnipropetrovsk

Facades based on structural elements

Elements in these buildings are designed to provide both structural and decorative function. Walls curved in plan, tilted and twisted beams as well as decorative columns are good examples how structural design and ornamentality of the facade may work together.

However, due to multifaceted nature of examples it is not possible to present simple abstraction of creation principles and analysis of the shared parameters.

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262., 263. CR 03 Pavilion nr 40
264. M006 Chisinau Circus
265., 266. M008 Restaurant Noroc
267., 268. M009 Railroad Workers Palace
269. RO08 Spartshall Bacau

270., 271. RO15 Restaurant Casino Mangalia
272., 273. RO16 Administrative Palace Ploiesti
274. RU08 Institute of Robotics St Petersburg
275., 276. UA12 Velyka Kishenya Kyiv
277. UZ10 Palace of Arts Tashkent

Conclusion of Analytical Part

I have been able to sort out the whole selection of facades into geometric families and to create the family tree of facades. This step was beneficial with creating a framework of processes and rules used when finding out the geometry of studied facades. This sorting formed the grounds for recognition of parametric patterns in studied material and was used in the second part for defining parameters in the Façade Generator Tool.

During the process of sorting the facades into families, I often encountered a situation when the given façade does not fulfill all the typical signs of a given group or could be a member of more groups at the same time. Although, I adjusted the sorting criteria, it was not possible to cover all facades and the overlapping between groups occurred, naming them as grey zones. In some cases, I created special families for those facades which did not fit into other groups. I decided to present the whole range with these grey zones to provide a complex overview without filtering problematic examples.

There are families like curve-based facades which as the name suggests are geometrically dependent on the use of the curves. But how the curves are applied in the geometrical process vary so much that I was unable to extract the defining parameters which would apply for the majority of shown facades. It would be possible to describe parameters of every single façade but that would be a very lengthy process and it would not benefit the idea of creating groups based on shared geometrical parameters.

Interesting feature of the Socialist Modernism facades is their modularity. Most of these facades are dependent on a grid of a certain kind and the single elements of the facades are usually mass-produced. Most of the given facades are composed of simple repetition of a single type element, which results in a basic façade. However, often those elements have been designed with additional transformations as rotation in mind. Therefore, by using a single kind of element and rotating or shifting them in different patterns architects and builders could achieve great amount variations with no additional efforts for creating different visual qualities of the facade.

Part Two

Parametric design

Parametric introduction

Learning how to script is, in my opinion, not just acquiring knowledge of new software, but it brings another layer to design thinking. The algorithmic approach is a process-based rather than outcome-based tool. This acquired knowledge of how algorithmic processes works allows us to use them flexibly in other contexts and create variants relatively quickly compared to traditional drafting techniques. A parametrically designed object is never done or finished it just represents the temporary result of processes based on a set of rules and parameters which can reparametrized in any given moment, presenting us with countless variations and versions of the same, but different object. The result of such a process is not a single object but a group of objects which follows the given rules and is based on provided input information. The designer then is able to select variants from a vast array of options.

In algorithmic modeling, the user works with geometry and its data. Through different tools, the user retrieves specific information from geometry in the form of a data list and then applies specific
operations that result in the transformation of the resulting object. The user has complete control over the process and since the processes are unlike traditional 3D models defined by dimensions but by mostly mathematical relationships. The scripts (such as Grasshopper programming structures) can be therefore applied universally on objects with similar features.

Creating rules and definitions might seem like a lot of additional work especially while working with simple geometry, but this lengthy process pays off in situations when there is a need for changing or adapting the design. Therefore, the algorithmic tools can be extremely useful in creating variants of certain design elements quickly. Also, there are a lot of applications of algorithmic tools as a source of valuable analysis which can be further processed, when using information and rules as parameters in the creation of evidence-based results.

One of the common applications of algorithmic modeling is the creation of facades, where also my interest in this diploma thesis is targeted. I find the façade as part of the building where I may unleash my creativity. I have noticed that sometimes the freedom of the expression can bring over choice and decision paralysis, or repetition of already proven solutions, because of fear of experimentation. It might be because experimentation takes too much effort, or it is time-consuming. For me, algorithmic modeling can be used in this situation to experiment fast with a lot of options. Possibilities of parametric design vary from simple sketches for proving concepts to tools that provide data for both standard and digital fabrication.

My goal in this thesis is to present the parametric possibilities of Socialist Modernism facades through the creation of a Social Facades Generator. This generator is based on findings of the geometric properties of selected facades and aims to add another layer to this theme. It uses modern tools to progress and develop a discontinued historical architectural theme. It is meant as a tool to connect history with presence and possibly the future. The generator can be understood as a way to present my algorithmic thinking and ability to script as well as present the extension of possible uses of qualities of socialist facades.

Creation of the Socialist Facades Generator

Definitions in the generator are inspired by the basic principles of analyzed facades. The parametric world extends the possibilities of the shapes and gives the user the option to create unique geometry based on the common rules of a given family. The resulting number of combinations of parameters is enormous. By using existing principles and extending them by use of digital tools we can achieve new, original elements that can be without problem be part of contemporary and future practice.

My aim is to target this tool, the Social Facades Generator, to be used by the wider public rather than just by algorithmic enthusiasts. Because grasshopper definitions are for most architects enigmatic and hard to understand I started thinking about presenting tools with a simplified graphical interface. That resulted in researching possibilities to upload whole grasshopper definitions on the internet while keeping their functionality and interactivity. I found a plug-in and platform called Shape Diver which is matching the needs of my tool the most. The other reason for this step was the limited possibilities of embedding 3D models and data files into PDF form.

The Social Facades Generator is not completely automatic, that user would push the button and the program would generate a façade. The generation depends on the input information provided by the user, the changes are displayed in real-time in the interface. The resulting geometry may be downloaded in 3.dm format and be used further. This should encourage users to try algorithmic modeling as well as familiarize with the socialist facades by using the geometry in their projects.

The Social Facades Generator is meant to provide simple geometrical sketches and options to the user. It is not supposed to create complete façade systems with openings according to the floorplans of the building. However, this might be one of the directions for the future development of this tool.

Here I present a quick overview of the basic parameters and functioning of the Socialist Façade Generator in step-by-step.

The Generator is based on the observation that most of the previously presented facades depend on various types of grids, mostly rectangular ones. The first step in facade generation is to create a basic volume for facades to be generated on. I have chosen rectangular cuboid because it's a simple definition and because of the references from the first part of the work. All dimensions of this object can be changed, as height definition I used the unit of one floor (typical 3000mm), to make the tool clearer.

On the base, the element is then applied to a grid whose spacing is defined by the width of the desired elements. The second direction is spacing dependent on the number of divisions of each floor.

With this division user then selects one of the types of facades from the list. The types in this list are inspired by families presented in the first part.

The point is that the parameters of the families on this list are similar in the basic nature. They usually consist of leading geometry which is then moved in the axis of the façade as well as moved away from the base plane by input parameters. The position of this geometry can be a point, line, or other element and which is then used for the creation of the three-dimensional element.

Since these operations are applied on every cell of the base grid at the same time the result is the generated façade. This result can be quickly changed by changing the parameters of the element as well as changing the dimensions of the main volume on which the façade is applied.

In the text the whole process seems to be rather trivial, however in practice, the process is more complicated due to the need for extraction and processing of necessary data or geometry to create a functional definition.

It is important to note that this workflow changes between façade types. This small overview is representing the general workflow of most facades in the generator, in most cases, there are more specific steps to achieve the desired geometry.

In the world of parametric modeling it is common to produce intricate facades which have each element different as they are shaped in reaction to the proximity of different operator objects as points or curves along the facade. I find this approach interesting, since it creates an array of unique elements, that may be manufactured separately. I decided to continue the idea of the creative standardization of facades in the first part. That means that I don’t use attractors in façade creation, but I utilize simple transformation such as rotation of selected elements to get more variety from the single façade element. Therefore, reducing possible manufacturing efforts by allowing the mass production of a few elements.

Results

The presentation of interactive tools in mediums with limited interactivity combined with an enormous number of combinations of parameters is problematic.

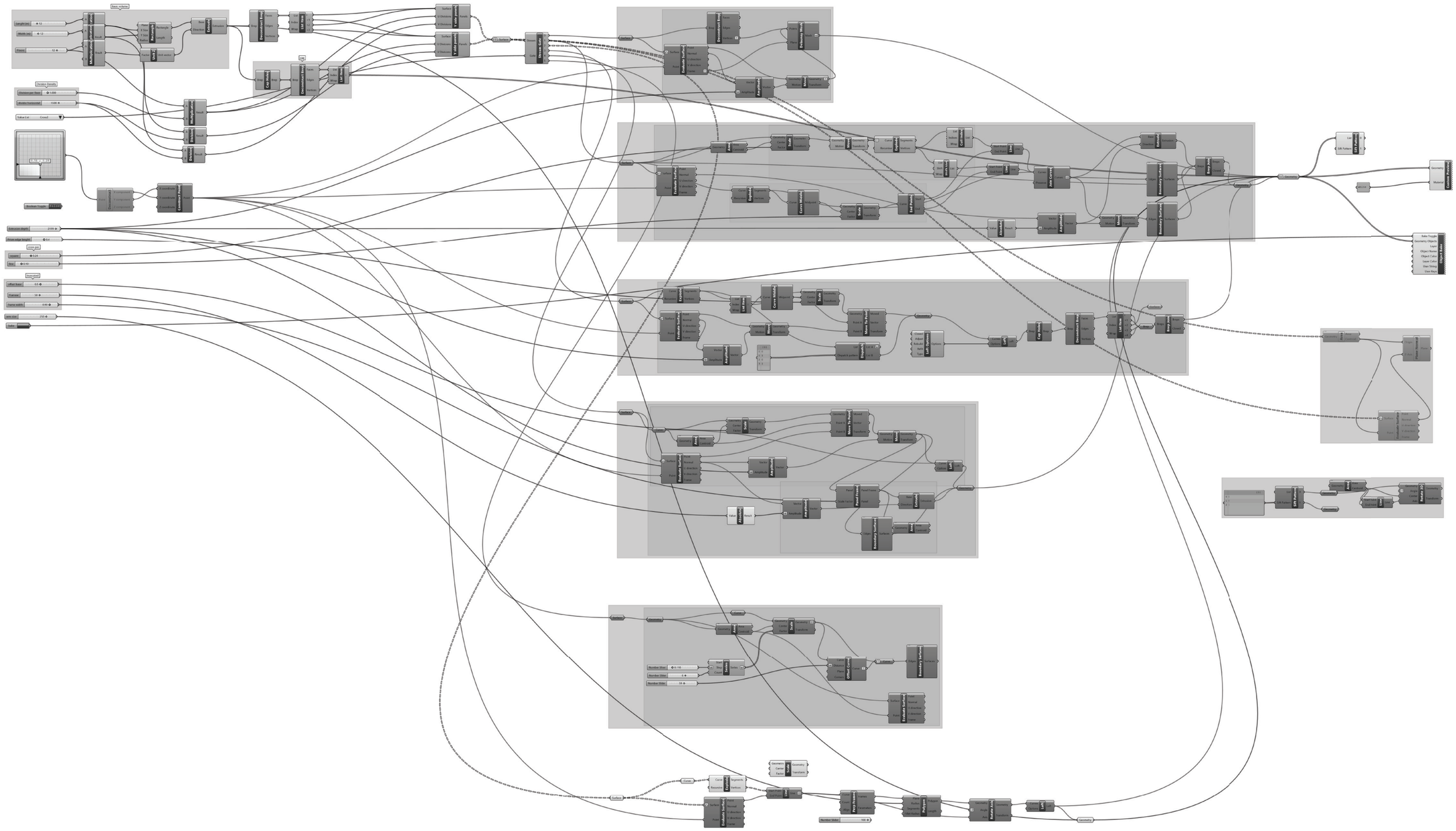
To show the result of changes of simple parameters on a single ornamental element I created a chart that shows the element in a few steps after a single transformation at the time was applied. This example is showing the possibilities of manipulation on a single element of one family. The basic transformations are similar across the families, but exact rules and the way of transforming geometry depend on the definition of a specific family definitions require completely different inputs.

This thesis is based on the use of ornamental elements in bigger repetitive surfaces. I show a graphic which is meant to indicate the volume of options and variability of the tool. The results differ dramatically from each other, but they are based on the same definition for each family, only the input parameters are changing. However, the graphic shows only a small fraction of the possible combinations, I present a narrow selection of results since the incremental steps can be too small to register.

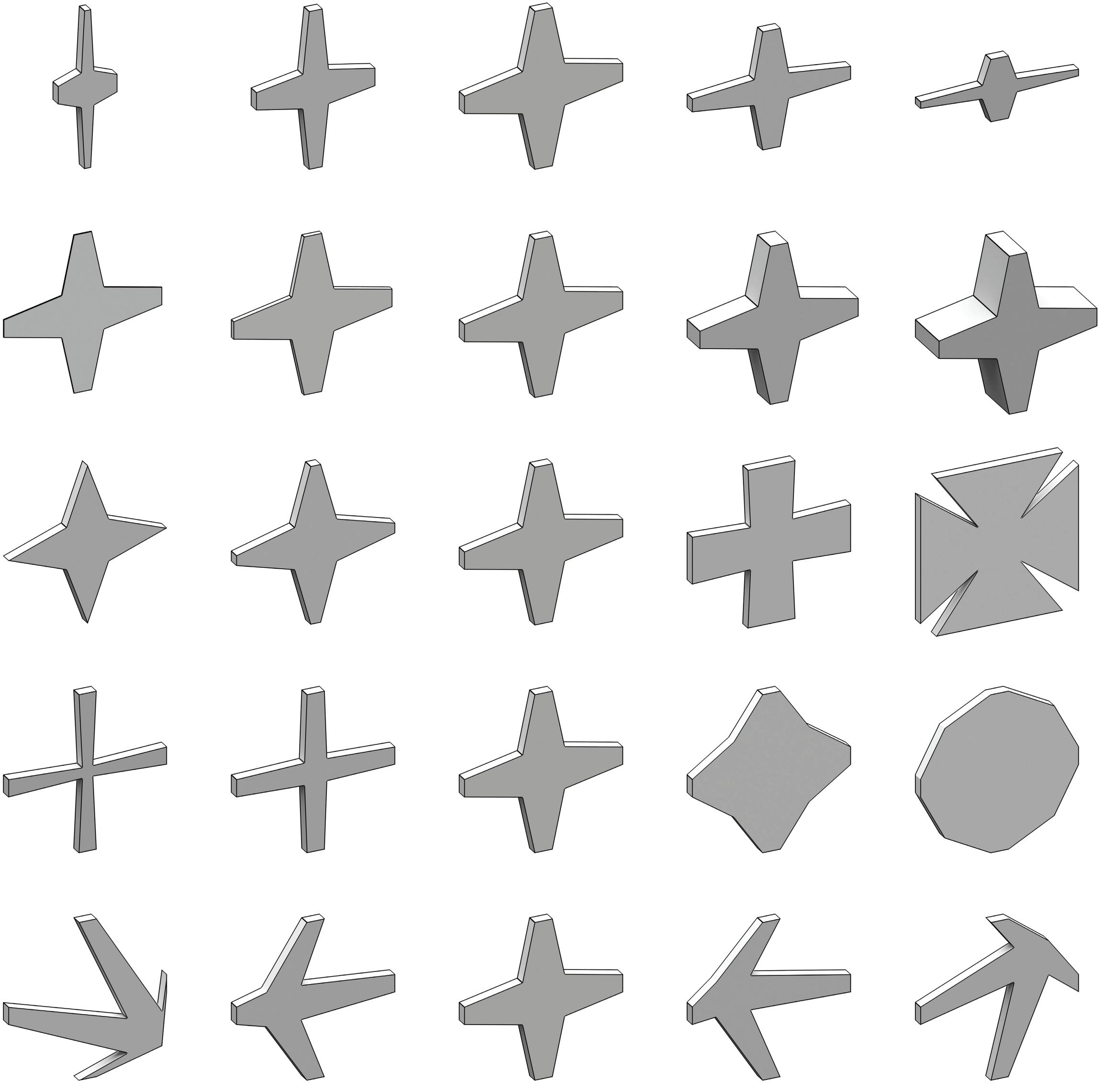
As the last step, I decided to use geometry created in the Socialist Facade Generator to show the flexibility of the tool in a more practical context. I hope to use these posters as a way to propagate my generator.

However, all the shapes and façade variations on the posters might not be available in the generator on the internet. More options go together with more input parameters and at a certain point, the interface cannot stay organized since the very different facade definitions require completely different inputs. I decided on this because the user-friendliness of the tool is more important than the sheer amount of options. This issue will possibly be solved by creating multiple, more specific generators in the future.

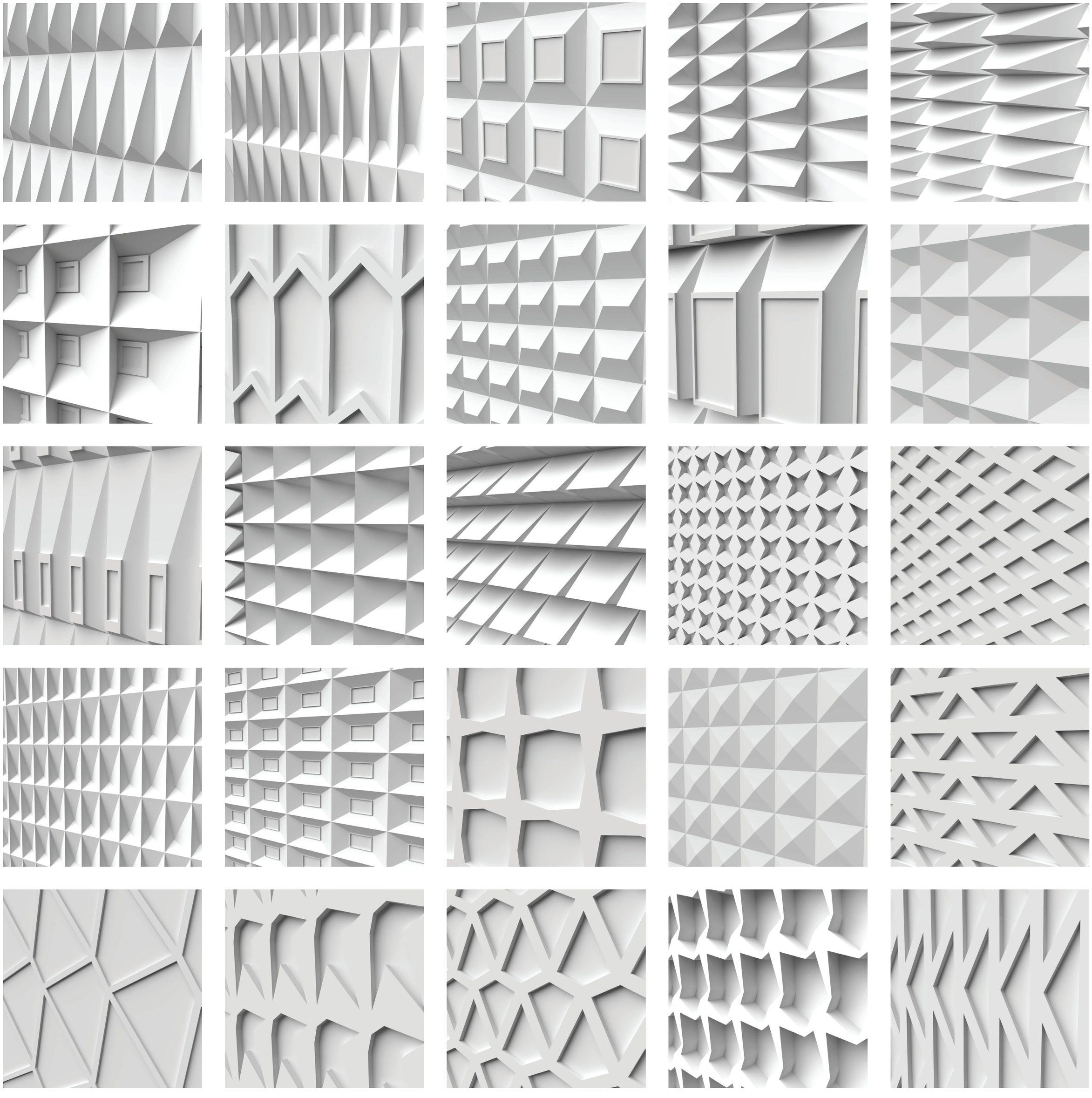
Grasshopper definition

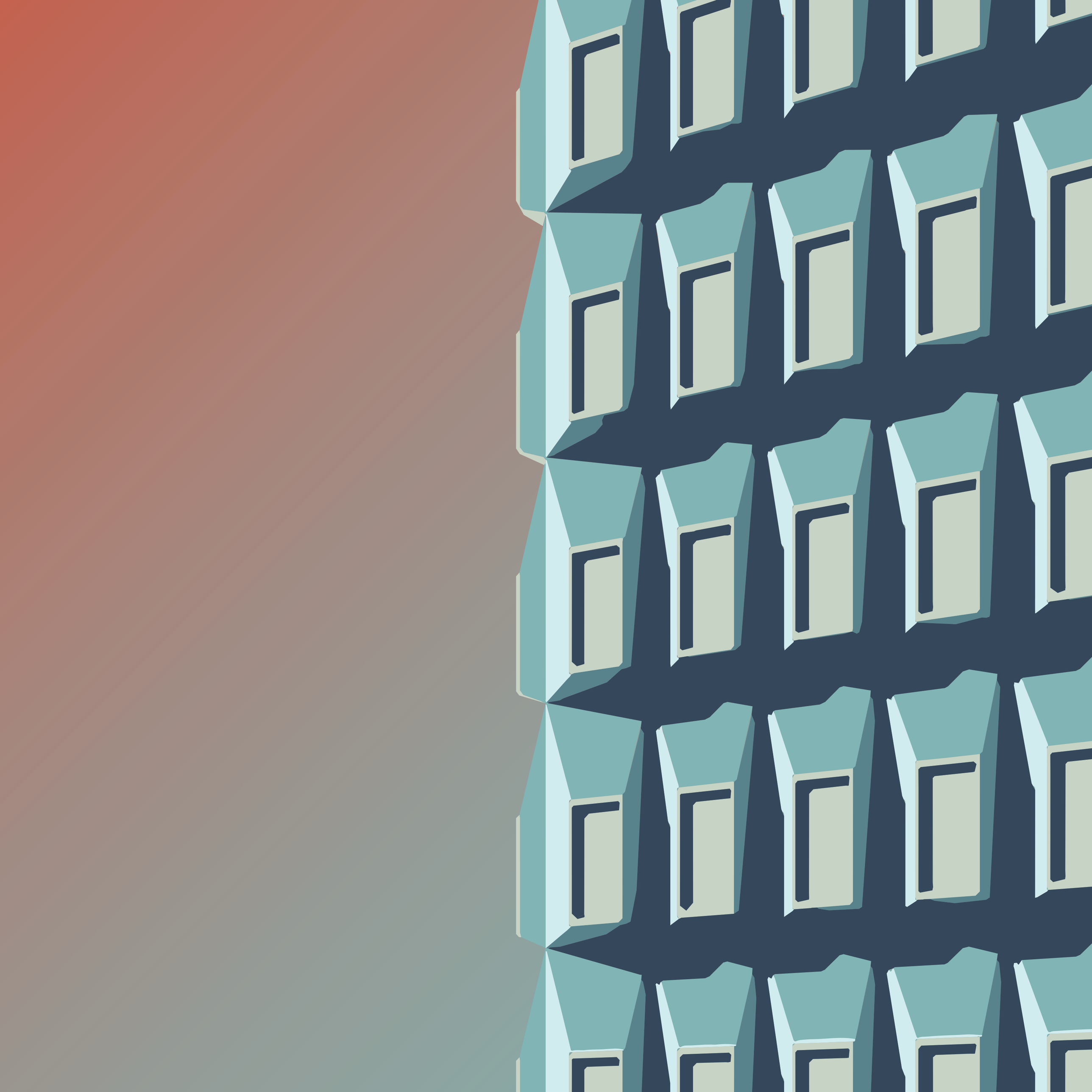


SINGLE PARAMETER TRANSFORMATION CHART



DEFINITION FLEXIBILITY CHART

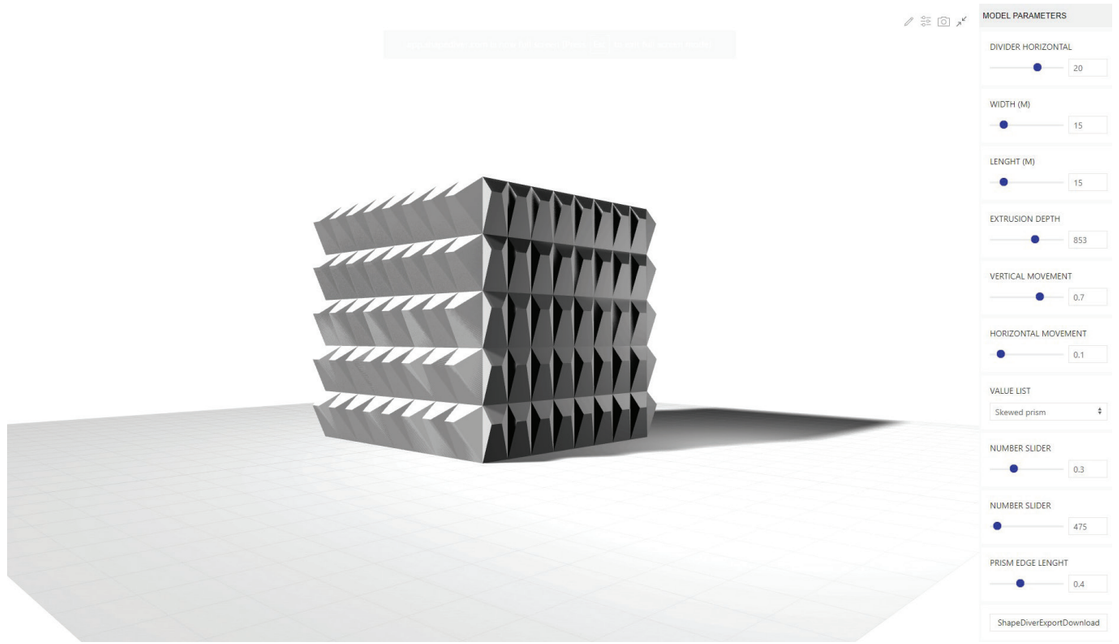




Socialist Facade Generator

Here I include link to the webpage of the Socialist Facade Generator.

https://rb.gy/myg0w9



Interface of Socialist Facade Generator

Conclusion

This diploma thesis was an experiment for me. I wanted to know if I can use socialist architecture as a framework to learn algorithmic modeling and by doing it create a new context for using historical examples and digital tools together in the creative process. Also, there was the idea of showing my ability to learn new things rather than presenting my already existing knowledge.

There are diploma thesis that are based on research and there is a design thesis. I decided to combine these two into an analysis-based design thesis. The most important thought behind this thesis was to learn new things meaning acquiring theoretical knowledge as well as learning new skills. I haven't just learned to script in grasshopper, I started to think about geometry and architecture differently.

In this thesis, I explored and gathered a large volume of sources which I then rigorously studied and sorted into specific categories. I attempted to understand the geometrical properties of elements with ornamental qualities from building built from the large geographical zone of the former Eastern bloc. I intended to show that even though most buildings built during the socialist era are indeed not very interesting or particularly charming there is a significant amount of buildings that are impressive even now. I wanted to present examples of good architectural works despite they are not on the pages of architectural books because the main scope of this field was for long years and maybe still remains on the west.

The result of the analytic part was utilized in the second part in which I created parametric definitions of facades inspired by those I have been studying and analyzing in the first part. I gathered these definitions into the Socialist facades generator. This generator is a sketching tool for facades utilizing the geometric qualities of socialist facades and provides a continuation of geometric thinking shown in examples of analytical parts. The idea was to present something based on history but being able to stand up in the contemporary context. This was achieved through the use of digital tools. Another point was to make my creation accessible to the other people, not just like document on the server, but something they can use and interact with. Socialist Facade Generator is a project started by this thesis, but I hope to extend it further in my carrier.

Hopefully I will benefit from newly acquired knowledge and my tools in my future professional life as well as my employers, clients, and collaborators.

I learned that many things can be automated, in modeling as well as in processing information and the creation of documents. I believe that learning how to do tasks more efficiently is worth it even if it takes as long as to do the task manually. Because acquired skill and knowledge can be applied later and it will be the next time when the time will be saved.

Besides many other things I have been contemplating my own identity, my relationship to architecture as well as the relationship between politics and architecture, the future of generative design, and many more. This diploma thesis provided me with a great possibility to deepen my knowledge in many different fields and showed me how much more I need to learn, and I am very grateful for it.

Thanks

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I would like to say thank you to everybody I had a chance to study with, especially to Martin Kovář, my colleague and lifelong friend.

I wish to express my gratitude to my friends in Mangoshake studio in Brno because they let me work on this thesis in their office. And to Ondřej Veselý who inspired me to start this journey into the algorithmic world.

Also, big thanks to the all people in Mad Bergen, because they are the people, who made me think about going studying abroad and enjoy architecture.

I would like to appreciate all international and Finnish students and people I had the chance to collaborate with and learn from them. And to all whom, I met during my life and had a meaningful conversation with.

And my biggest thanks to my family for all the support you have shown me through my studies and my life.

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Image References

Organization of the image references uses the same logic and order in which they are presented in the thesis. Each image has correesponding number which works as identifier. The numbering coresponds between references and content of the thesis. Dividing references by pages and adding visual clues has been applied to make referencing picture more clear.

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a, b van Duivenbode, O., & Hjortshõj, R
c Foster + Partners.
d Vojtěch, Z.
e Uusheimo, T.
f COAST
g, k, l Mørk, A.
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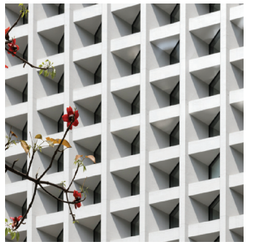

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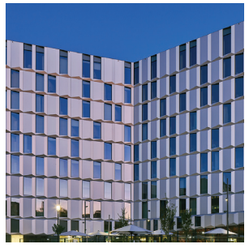

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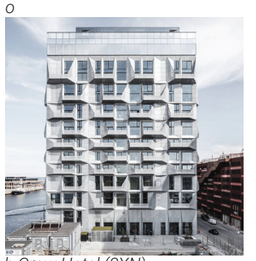

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a, b Ragnarock (Cobe, MVRDV)
c Murray Hotel (Foster + Partners)
d Urban Creme Hotel (r15)
e Kuopio City Theatre (ALA Architects)
f Charging station(Cobe)
g Middelfart Savings Bank (3XN)
h Grow Hotel (3XN)
i Aqualuna (3XN)
j VM Houses (BIG, JDS)
k, l Bodo city hall (Lorentzen Langkilde)
m, n NorraTornen(OMA)
o, p The Silo (Cobe)

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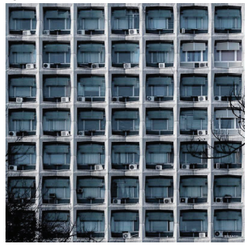

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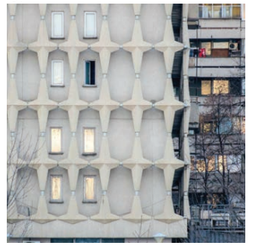

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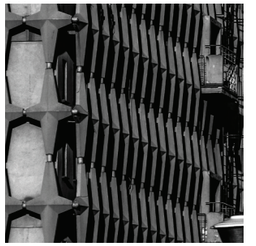

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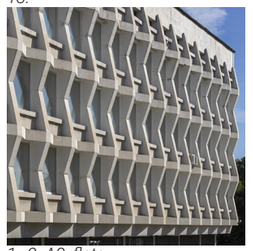

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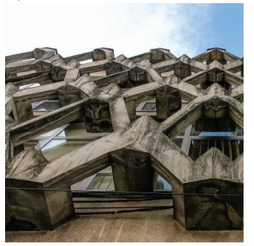

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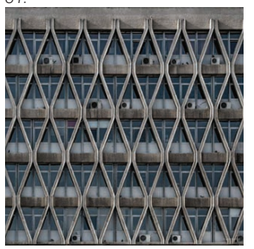

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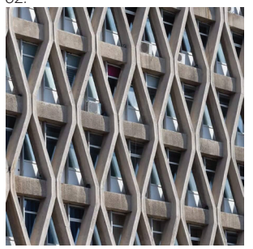

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25. -27. RO06 Sugar factory HQ Buzau
28.-30. RO07 Consproiect Building Ploiwesti
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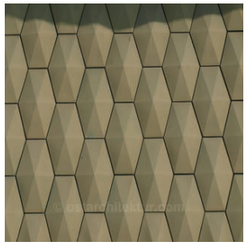

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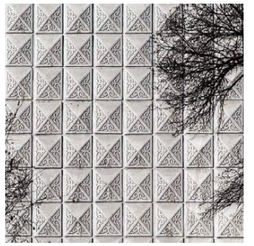

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33., 34. CR 01 Austrian pavilion
35., 36. DE09 Robotron
37. DE11 SED-Bezirksparteischule
38., 39. DE18 Housing
40., 41. KZ05 Lenin Palace Almaty
42., 43. KZ10 State Archive Almaty
44. RO10 Gheorghiu-Dej Sport Hall Onesti
45., 46. RO14 Hotel Traian Braila
47. TJ02 House of Pol. Education Dushanbe
48. UA11 Roofed market Gitnie

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49., 59., 61., 63. Ostarchitektur, Peter Sägesser
50. - 52., 62. © BACU
53. Flickr.com, Martin Maleschka
54., 56. Flickr.com, Jim, Cooper,
55. Flickr.com, ph-low
57. Flickr.com, Rob Weststrate
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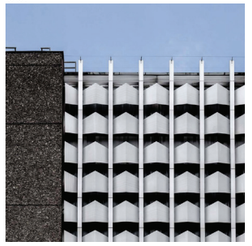

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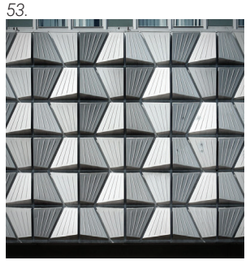

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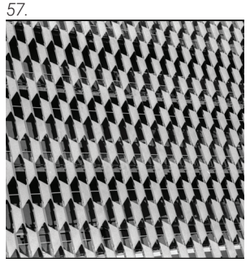

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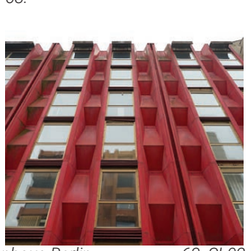

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49., 50. DE01 Ministry of Stasi
51., 52. DE20 Cent. Warenhaus Magdeburg
53.,54. DE33 Cent.Warenhaus SchwedtOder
55., 56. DE35 Stadhalle Cottbus
57. DE36 Centrum Warenhaus Berlin
58., 59. HU08 Kelet dept. store Nyirégyháza
60. HU14 Szabolcs Dept. store Kisvárda
61., 62. LV01 Museum of occupation Riga
63. SL02 School Ljublana
64. UA02 Cirkus dnjepropetrovsk

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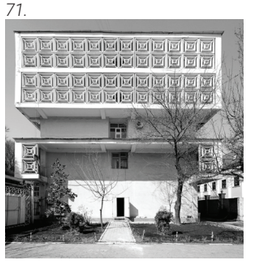

65., 66. TJ05 Ministry of Industry Dushanbe
67., 68. DE28 Rundkino dressden
69.-71. SRB01 Politika Tower Belegrad

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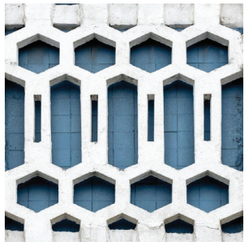

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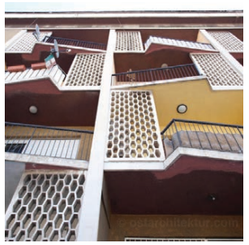

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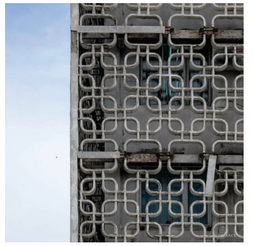

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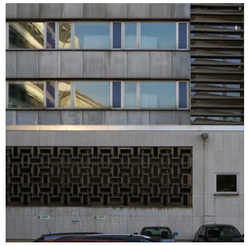

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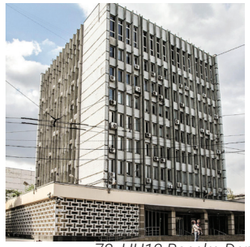

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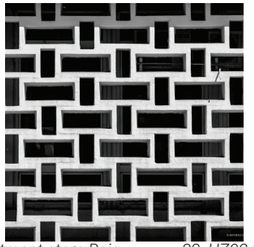

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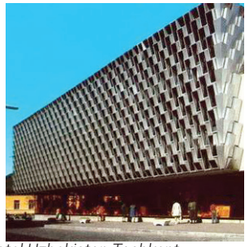

72. AZ04 Teachers' Institute Baku
73., 74. BO1 Oslobodjenje
75. DE16 Housing complex Halle neustadt
76. DE04 House of state
77. HU01 Residental building Budapest
78. HU13 Bacska Department store Baja
79. MO10 Institute of Technology
80. RO01 Kino Kosmos Brasov
81. TJ04 Writers' house Dushanbe
82. UA04 University Physics dept. Kyiv
83. UZ02 Hotel Uzbekistan Tashkent
84. UZ06 Lenin Museum Tashkent
85., 86. MO11 State Bank
87. HU13 Bacska Department store Baja

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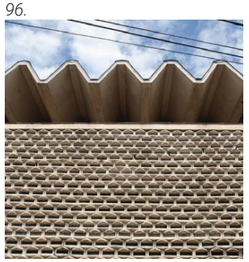

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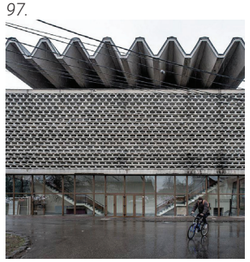

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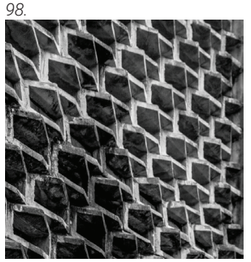

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88.-90. DE17 Konsument Warenhaus Leipzig
91., 92. HU03 Residental building Budapest
93., 94. HU11 Skála shoping center Székesfehérvár
95. MK01 Communist party HQ
96.-99. RO05 Aula Magna hall Timisoara
100., 101. UZ12 Turkistan Concert Hall Tashkent

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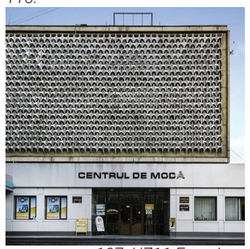

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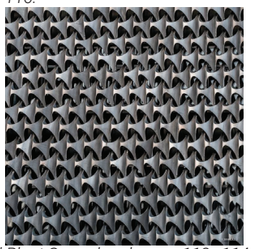

117.


102. A9 fence of hotel Dvin
103.,104. CR 02 Slovenian pavilion
105. DE08 Hotel Newa
106. DE10 Robotron
107. UZ11 Experimental Plant Samarkand
108.,109. DE19 Burohaus Liepzig Stassi
110. DE26 Unknown
111.,112. DE27 Haus des Reisens
113., 114. GE02 Residental building
115., 116. MO01 Fashion center
117. RU02 Housing Kaliningrad

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118. Kathmandu and beyond
119., 129. Roberto Conte

120. mywanderlust.pl
121. - 123., 127., 128., 130. - 133. © BACU
124. Architekturzentrum Wien, Simona Rota
125.,126. Ostarchitektur Peter Sägesser

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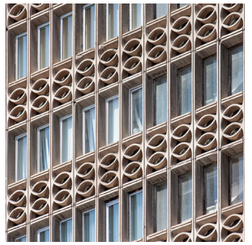

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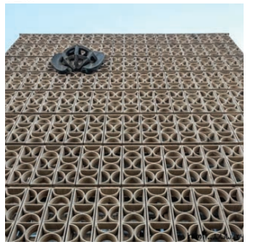

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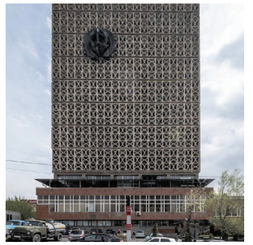

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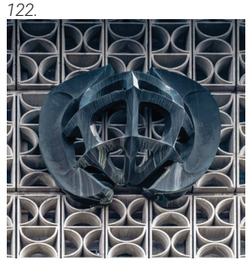

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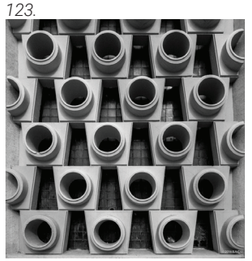

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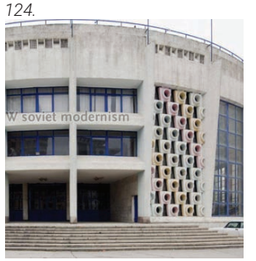

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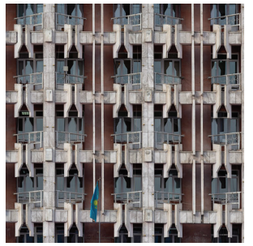

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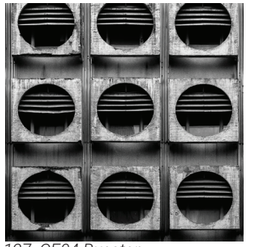

133.


118.,119. A12 Centre for Geodesics and Cartography
120.-122. A3Automatic Long Distance Telephone Station
123., 124. AZ02 State circus Baku
125., 126. DE12 Schule typ Erfurt

127. GE04 Busstop
128.,129. KZ01 Al-Farabi Kazakh National University Almaty
130.-132. MO07 Parliament Parking
133. UA01 Apartment building Kharkiv

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134. Armine.S
135., 137., 138. Ostarchitektur Peter Sägesser

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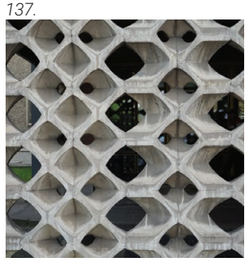

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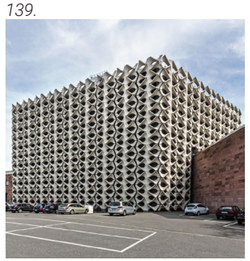

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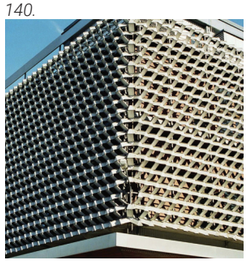

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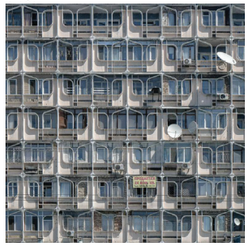

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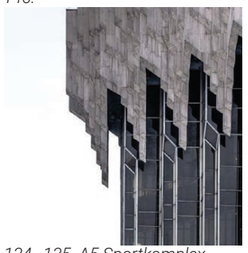

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159.Šmídek, P.
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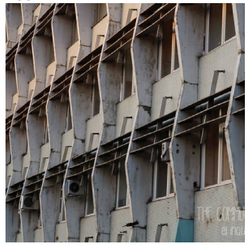

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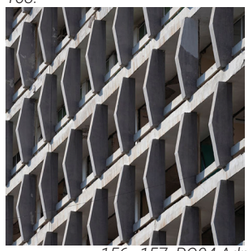

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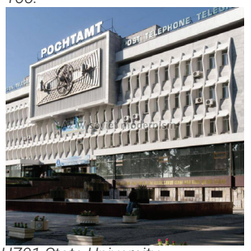

150. A6 Afrykian culturehouse
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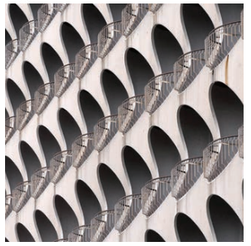

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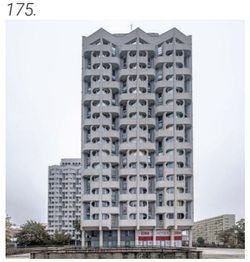

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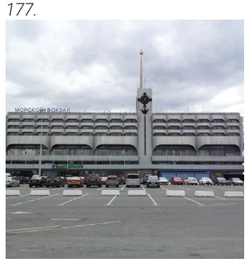

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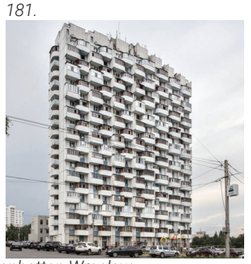

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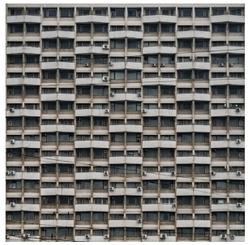

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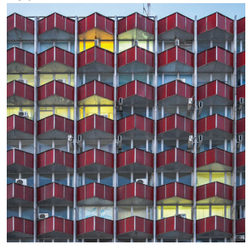

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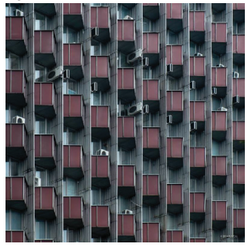

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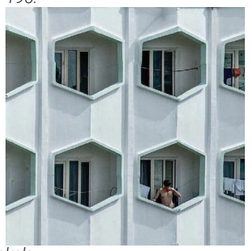

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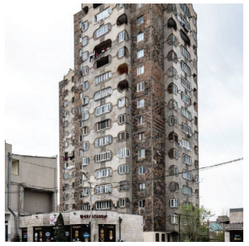

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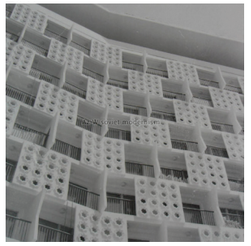

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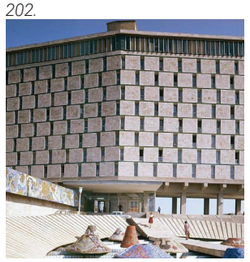

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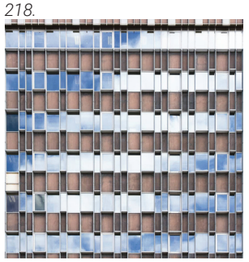

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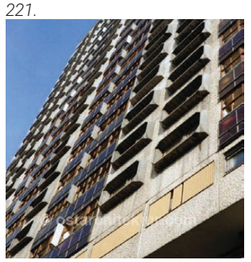

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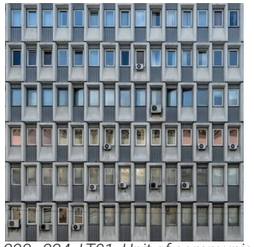

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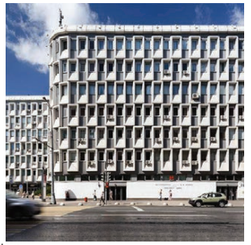

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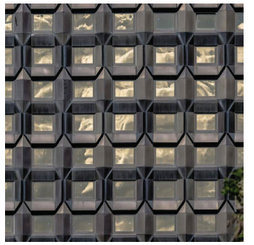

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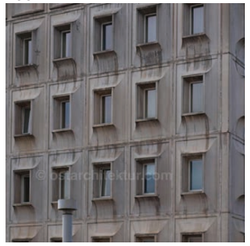

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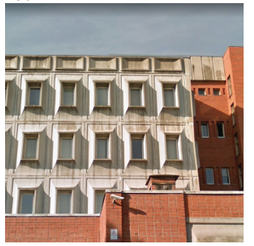

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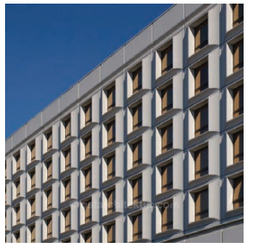

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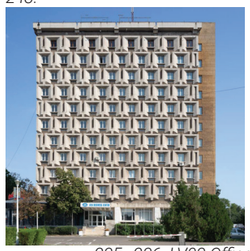

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230. BE 1 belbytechproject
231., 232. BU 02 Hotel rodina
233. CZ 05 Centrotex
234. LT02 City Center Development Vilinus
235., 236. LV03 Office building Riga
237., 238. MK02 Post and telecom Skopje
239. MO14 Depatment store Calarasi
240., 241. PL03 Hotel Sofitel Warsaw
242., 243. RO17 Hotel turist Galati
244. RU01 House of Soviets Kaliningrad
245. UA15 Bus station Dnipropetrovsk

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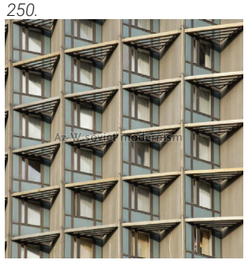

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246. BE 2 Resitental
247., 248. BU 01 Housing block
249., 250. KZ02 Hotel Kazakhstan Almaty
251., 252. PL08 Housing building Wroclaw
253., 254. RU07 Housing St Peterburg
255.-257. RU10 Belokon building Samara
258., 259. UA05 Sanatorium Druzhba Crimea
260., 261. UA14 Regional court Dnipropetrovsk

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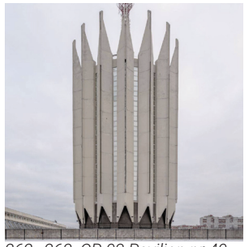

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262., 263. CR 03 Pavilion nr 40
264. MO06 Chisinau Circus
265., 266. MO08 Restaurant Noroc
267., 268. MO09 Railroad Workers Palace
269. RO08 Spartshall Bacau

270., 271. RO15 Restaurant Casino Mangalia
272., 273. RO16 Administrative Palace Ploiesti
274. RU08 Institute of Robotics St Petersburg
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